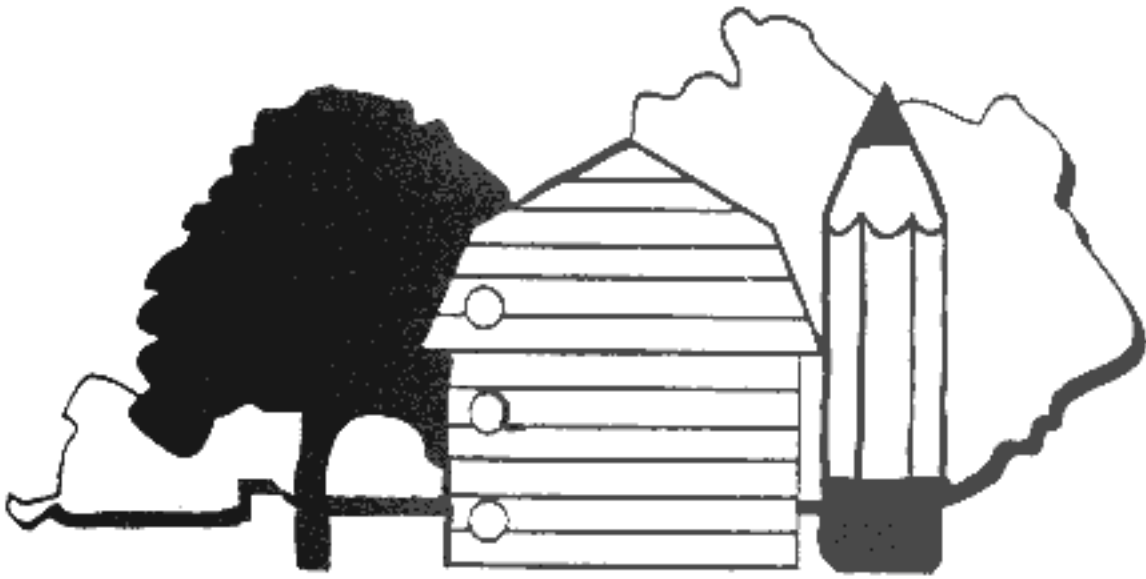


CREAM OF THE CROP

A BOOK OF LESSONS
ABOUT AGRICULTURE AND THE ENVIRONMENT



Published by Kentucky Agriculture and Environment in the Classroom, Inc.

For more information contact:
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COMMONWEALTH OF KENTUCKY
DEPARTMENT OF AGRICULTURE
COMMISSIONER'S OFFICE
ROOM 188, CAPITOL ANNEX
FRANKFORT, KENTUCKY 40601

Dear Kentucky Teacher:


We in Kentucky depend on agriculture for the food on our tables, jobs for our families and friends, and an economic stimulus for our Commonwealth. Kentucky agriculture not only impacts Kentucky farmers; it also affects every child, parent, person, and family. Agriculture is alive and growing in the Commonwealth, and Kentucky is proud of the contribution made by its farmers.

Kentucky Agriculture and Environment in the Classroom, Inc. equips teachers with the resources they need to teach their students about the important role of agriculture and the delicate nature of the environment in their everyday lives. Moreover, it provides resources like the lesson plans in this publication to help teachers in all grade levels enhance their classroom instruction and incorporate agriculture and the environment into their daily curriculum.

We hope you will use the following lesson plans to involve your students in hands-on learning about agriculture and the environment. Agriculture and the environment should be interesting and exciting topics in your classroom.

The Department of Agriculture and I thank you for the contribution you make to the development and education of Kentucky's youth. Best wishes and thank you for making a difference in the lives of our future leaders.

Sincerely,


Billy Ray Smith
Commissioner

BRS/mb

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OVERVIEW

Kentucky Agriculture and Environment in the Classroom, Inc. (KAEC) is pleased to provide you this book of lessons for teaching about agriculture and the environment. Teachers can use these representative lessons to integrate agriculture and the environment content in a variety of subjects and at different grade levels. KAEC strives to encourage and promote a partnership between agricultural and environmental groups and the educators of the Commonwealth in order to integrate the important concepts of agriculture and environment into the curriculum.

The overall purpose of KAEC includes:

- *To assist in the development and dissemination of educational materials and programs to increase agriculture/environmental literacy among educators and their students.*
- *To assist in the building of strong partnerships among the total agricultural/environmental community and the educational system.*
- *To assist in implementing a statewide promotional campaign and public information network about agriculture and the environment in the classroom.*
- *To encourage and assist in the development of educational programs that respond to the trends and demands of the food and fiber industry, environmental issues, natural resources system, the world marketplace and a global society.*

KAEC accomplishes this purpose by offering one, two, and three-day professional development workshops and week-long summer institutes on university campuses for graduate credit or professional development credit. In addition, teachers who have participated in KAEC workshops or courses may request the KAEC Mobile Unit to make a two-day visit to their schools. This 32-foot enclosed trailer contains resource materials for teachers to use when teaching about agriculture and the environment. For more information about how to participate in KAEC-sponsored teacher training contact **Rayetta Boone at (502) 564-4696, Kentucky Agriculture and Environment In the Classroom, Inc., P.O. Box 814, Frankfort, KY 40602-0814.**

Over 1,000 teachers have participated in KAEC workshops and courses over the past six years. Most of these teachers submitted lessons, units, resources, videotapes, pictures, or newspaper articles that documented their teaching accomplishments. From these various products, a committee of teachers gleaned lessons that are representative of the agriculture and environmental content being taught in Kentucky's schools. Some of these lessons are presented in this publication. Each lesson stands alone (i.e., it may be used independently). Each lesson has stated Academic Expectations and Student Objectives. Teachers are encouraged to develop means of assessing students based on these Academic Expectations and Student Objectives.

Some projects and activities occurred frequently in the reports submitted by teachers. These include grow-lab activities, outdoor classrooms, partnerships, Agriculture (AG) Days, and use of the Mobile Unit. Because of the popularity of these projects and the successes of many Kentucky teachers in completing them, the editors have given brief descriptions of them. These are found in the second part of this publication, "Popular Projects and Activities."

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ACKNOWLEDGMENTS

We are especially grateful to the Kentucky teachers who have participated in KAEC workshops and summer institutes, and who have submitted samples of their teaching accomplishments. We also thank the Board of Directors of KAEC, Kentucky Department of Agriculture, and Commissioner Billy Ray Smith. Without their leadership, support, and encouragement, this publication would not be possible.

We believe teachers will find the lessons and projects enjoyable and worthwhile, while contributing to the accomplishment of the goals of the Kentucky Education Reform Act. The editors have worked diligently to maintain the integrity of the original lessons and activities of the teachers who developed and taught them. Nevertheless, the editors and reviewers are responsible for any errors of omission or commission.

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PRIMARY



COVER CROPS

Teacher: Mildred Mabry

County: Christian

School: Crofton Elementary

Grade: Primary

Academic Expectations:

2.2 Students identify, analyze, and use patterns such as cycles and trends to understand past and present events and predict possible future events.

5.3 Students organize information to develop or change their understanding of a concept.

1. FOCUS

Student Objective:

- Students will apply language arts skills (i.e., reading, spelling, and story development) as they learn about the importance of cover crops.

Background:

A cover crop is a crop grown to cover bare ground during a time that another crop cannot or will not be grown. Cover crops have long been used to reduce soil erosion and add organic material to improve the soil. With the development of no-till cropping systems, cover crops were recognized for their ability to provide moisture-conserving residues as well as nitrogen for the succeeding crop. Recent concerns about the quality of water have provided new reasons to use cover crops. Cover crops have the ability to take up and hold nutrients, especially nitrogen. They reduce weed problems and the need for herbicides by competing with them for space and nutrients.

No-till farming in the United States began in Christian County by local farmers. Their new idea for farming was first not considered a sensible or lasting practice by many traditional farmers. However, it has proven to be a good and lasting one.

2. PREPARATION AND MATERIALS

Chart paper

Markers

Chalkboard

Chalk

Paper

Pencil

3. TEACH

Activities:

1. Brainstorm or have the children write on paper what they think a cover crop is. Why is it called cover crop? Discuss the idea that a "cover" crop is not a blanket or a quilt, but it is for the protection of fields.
2. As a group, make up a silly story about a blanket or quilt covering on the fields. Use spelling or reading words. Ask the following questions:
 - What would you plant to get a blanket to grow?

- What color would it be?
- How would you harvest it?

Discuss seasons and the order (pattern) in which they come.

End the story with the character(s) learning that a blanket is not a farmer's crop; the farmer is not raising blankets, even if the family makes quilts in the house! Display the story in the classroom.

3. Begin a daily log of farm life as the unit is studied. Each child may keep the entries in a spiral notebook. Covers may be original designs by the children.

4. Brainstorm a name for the farm. Some examples include Sorry acres, Liberty farms, and Churchill farms. After voting and deciding on a name, prepare a sign and display it over the door.

4. CONNECT

Community: Take a field trip to a local farm or invite a farmer to visit the classroom.

Language Arts: Ask students to spell the new words they have learned on the board. This lesson also provides the opportunity to develop and use new vocabulary words.

DO EARTH WORMS LIKE LIGHT?

Teacher: Barbara Knott and Cecilia Yates

County: Daviess

School: Bishop Henry J. Soenneker Elementary

Level: Primary or Intermediate

Academic Expectations:

2.1 Students understand scientific ways of thinking and working and use those methods to solve real-life problems.

2.10 Students understand measurement concepts and use measurements appropriately and accurately.

1. FOCUS

Student Objective:

- Students should be able to observe and make deductions, use critical thinking skills, and use scientific skills to solve problems.

Background:

This lesson could be part of a larger environmental and/or agricultural unit. Lessons covering seeds and planting, beneficial insects, composting, soil conditions, weather, and farming practices might precede this lesson. Using worms for teaching about composting is especially motivating. The cost and care for worms is minimal. The scientific method should be explained before teaching this lesson.

Concept:

Scientific Method

2. PREPARATION AND MATERIALS

Large dish pan or similar container

Paper towels

Cardboard large enough to cover one-half of the dish pan

Water

Several earthworms

Gummi worms (for prizes)

3. TEACH

Introduction:

Ask the question, "Do earthworms like light?" Encourage students to make their predictions before starting the activity. This same activity can also be used with small groups.

Activities:

1. Place loose soil in pan.
2. Distribute several earthworms randomly throughout the pan.
3. Cover one-half of the pan with the cardboard so that the area of soil in that half is dark.

4. After four or five days) have students dig up the worms and record the number of worms in the dark area) and the number of worms in the light area. (Hint: Since worms avoid light) more worms should have moved to the dark area.)

4. CONNECT

Science: Examine earthworms with a magnifying glass to see segment division and body bristles.

Measure earthworms with a ruler.

Measure how far an earthworm travels in a specific period of time.

Have a "worm fair" for students to compare "class" worms. Which is fattest? Longest? Fastest? (Use gummi worms for prizes).

Observe how earthworms move and turn over; feel their skin.

Locate a blood vessel along the earthworm's back.

Let students adopt and care for their own earthworms.

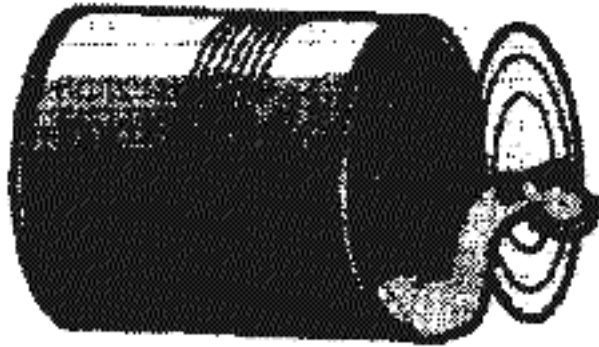
Encourage students to study the eating habits of earthworms - try coffee grounds, chopped onion, lettuce, and chopped pieces of apple. Which do earthworms like most?

References:

Huels, Agens. Earthworms, CommjiniKAPS, Kentucky Science Teachers Association Newsletter, 54. (1995)

McLaughlin, Molly. Earthworms, Dirt and Rotten Leaves. (1986)44

Assessment- Earth Worms



You and your best friend want to go fishing. You don't have enough money to buy fishing worms. You decide to search for worms. Where are some places you might predict will be homes for the worms? Explain why you thought worms might live in these places.

Scoring Guide

4. Explains selection with three characteristics of a worm habitat.
3. Explains selection with two characteristics of a worm habitat.
2. Correctly identifies more than one worm habitat or gives one characteristic of worm habitats.
1. Correctly identifies possible worm habitat.

Characteristics of earthworm habitats:

loose soil
lack of light
moist
compost materials

FARM ANIMALS

Teacher: Peggy S. O'Neal

County: Daviess

School: Heritage Christian Academy

Level: Primary

Academic Expectations:

2.3 Students identify and describe systems, subsystems, and components and their interactions by completing tasks and/or creating products.

1. FOCUS

Student Objectives:

- Students will be able to name Kentucky farm animals and recognize the sound that each animal makes.
- Students will also be able to identify products that come from farm animals.

Background:

This lesson provides basic information about farm animals by having students relate farm animal sounds and products to the correct farm animal. The lesson can serve as a lesson leading to additional study of farms and farm animals.

Concepts:

Farm animals

Useful products from farm animals

2. PREPARATION AND MATERIALS

1. Bring some of the following animal products (or a picture of the animal products to class. These products will be used in an activity related to identifying animal products.

Cow: beef (hamburger, steak); leather goods (wallet, belt, leather shoes); Pet food; photographic film; candles.

Chicken: poultry (fried chicken, chicken nuggets); eggs.

Hogs: meat (bacon, sausage, ham); leather (gloves, shoes).

Horses: Racing (Kentucky Derby, Churchill Downs); pulling

Sheep: wool; sheepskin Oackets, gloves, seat covers).

Turkey: meat (Thanksgiving); feathers.

2. As an optional activity, arrange for a local farmer to bring baby farm animals for the students to hold and pet.

3. Copies of Worksheet #1, "Name that Farm Animal."

4. Copies of Worksheet #2, "Where do I come from?"

3. TEACH

Introduction:

Ask the question, "What is the first thing that comes to your mind when I say 'farm'?" Explain that raising farm animals is an important part of farming in Kentucky. Ask students to name some farm animals that are

raised in Kentucky. Encourage students to come up with possible reasons that these animals are raised in Kentucky.

Activities:

1. Work step by step through Worksheet #1, "Name That Farm Animal," filling in the more common animal names first. A list of male and female farm animal names is provided at the top of the worksheet.

2. Once a name has been used, it should be marked off so that the remaining blanks are filled by elimination.

3. After all of the blanks are filled on the worksheet, allow students to make the sounds of each farm animal. This can be accomplished by writing the sounds (in words) on the board and asking students to sound out the words.

Cow - Moooooooooo

Chicken - Cluck, cluck

Hog - Oink, oink

Horse - Neigh, neigh

Sheep - Baa, baa

Turkey - Gobble, gobble

4. Work step by step through Worksheet #2, "Where do I come from? Instruct the students to cut out the pictures of the animals and paste them next to their products.

5. Show the animal products (or pictures of animal products) one at a time to show students. Encourage students to name the animal associated with each product. Explain how the products are made from the animals (especially less obvious ones). If it has been arranged, allow students to pet and hold real baby animals.

4. CONNECT

Science: Encourage students to learn more about the different Kentucky farm animals, such as their care and what they eat.

Community: Ask students to work with their parents in identifying products from farm animals that are found at their homes.

Music: Have students make the sounds of different farm animals as part of a song, such as "Old MacDonald Had a Farm."

Name That Farm Animal

Worksheet # 1

boar	hen	rooster
bull	hen	sow
ewe	mare	stallion
heifer	ram	torn

What are the names of male and female farm animals? Fill in the blanks below with farm animal names from above. Cross out the farm animal name once it is used (notice that hen is used twice, but the name is listed twice above).

Cow

Male_____

Female_____

Chicken

Male_____

Female_____

Hog

Male_____

Female_____

Horse

Male_____

Female_____

Sheep

Male_____

Female_____

Turkey

Male_____

Female_____

Where do I come from?

Worksheet # 2

Cut out the animal products and paste them next to the appropriate farm animal.



*as you can see, a few of these items may be used with more than one animal.



Happy Thanksgiving!



FARMERS AND THE ENVIRONMENT

Teacher: Janice Van Ripper

County: Jefferson

School: St. Matthews Elementary

Grade: Primary

Academic Expectation:

2.6 Students will understand how living and nonliving things change over time and the factors that influence the changes.

1. FOCUS

Student Objectives:

- Students learn the important role farmers have in protecting the environment.
- Students list ways crops are used other than for food.

2. PREPARATION AND MATERIALS

Two videos are used in this lesson:

"Sherlock Holmes and the Mystery of the Pollution Solution" (The World of Corn Kit). Available through the Kentucky Farm Bureau Lending Library and is available on the KAEC Mobile Unit. Issued by the Kentucky Corn Growers Association 502 /495-7700.

"Once Upon A Soybean" (The Soybean Solution Kit). Issued by the Kentucky Soybean Assn. 502 / 365-2506.

3. TEACH

Activities:

1. Show the video "Sherlock Holmes..."
2. Discuss important highlights such as:
 - Corn is the number one crop.
 - Gas can be made from corn (ethanol).
 - Plastics made from corn are biodegradable.
3. Show the video "Once Upon A Soybean."
4. Discuss how soybeans are utilized in more than eating:
 - plastics
 - fuel
 - newspapers (soy ink)

4. CONNECT

Language Arts: Ask students to write an essay on why farmers are important. Students will explain in writing what they have learned about the importance of farmers and farming.

PLANT A PIZZA GARDEN

Teacher: Linda Dyer and Carolyn Faulkner

County: Boyd

School: Cannonsburg Elementary

Level: Primary

Academic Expectations:

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real life situations.

1. FOCUS

Student Objectives:

- Students should be able to demonstrate an understanding of space and dimensionality.
- Students should be able to demonstrate an understanding of the economic decisions (cost and labor) regarding the production of pizza ingredients.

Background:

This lesson can be used with other lessons covering predictions and observations about seeds, plant growth, weighing and measuring, charting and graphing favorite foods, and nutrition.

Other possible topics include the history of farming, composting, farming practices, the effects of weather or soil conditions on food production, and food processing.

Students and teachers choose pizza for their primary focus because it is often the food choice of most students, and is sure to be an "attention-grabber". The garden should be planted after the last frost date, and can be harvested when school resumes in the fall.

Concepts:

Teamwork, measurement, change, decision-making

2. PREPARATION AND MATERIALS

shovel, spades, seeds or plants, small wooden stakes, string, measuring tools

3. TEACH

Introduction:

Before the pizza garden can be planted, the students must first answer many questions. During this brainstorming session, possible questions might include:

- Where would be the most suitable location?
- What size should it be?
- What materials are needed in order to plant?
- How much will it cost to plant?
- Should seeds (less expensive) or plants be used?
- How should the pizza circle be divided?
- Who will tend the garden over the summer?

Each group can be given responsibility for one segment to plant.

Activities:

1. First, the area must be measured and marked.
2. The outside perimeter should be dug first to define the boundary of the garden. Then all soil can be turned over and additional amendments can be added.
3. Each group is now responsible for planting their segment. Seeds could include tomato, pepper, oregano, and basil.
4. Finally, marigolds (seed or plants) are planted all around the circumference to represent the crust.
5. Don't forget to water!
6. When school resumes, be sure to "harvest" your pizza and use your toppings to make and bake a real pizza. (Don't forget to include those students who created the Pizza Garden).

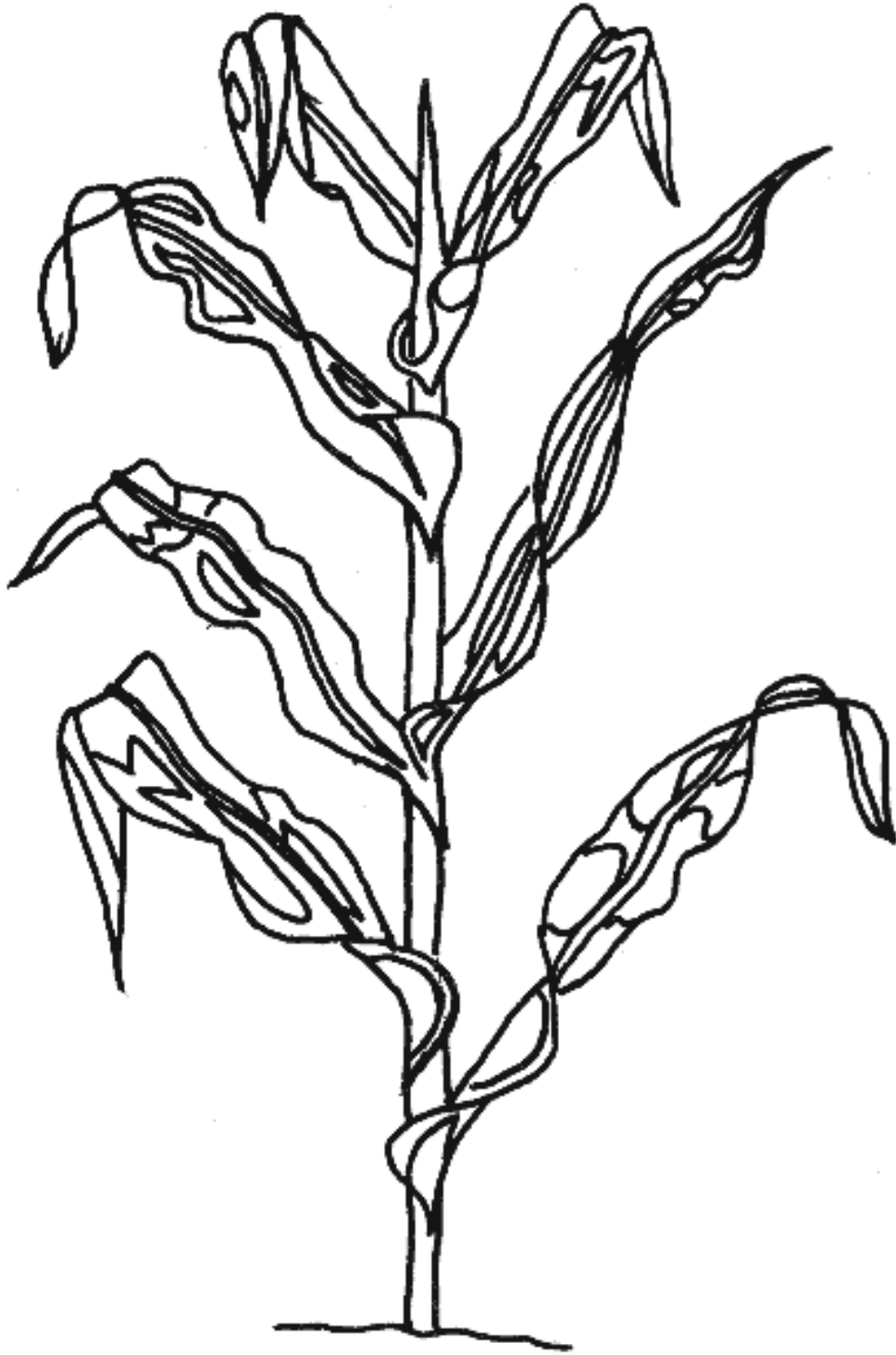
4. CONNECT

Community: Visit a farm to learn what is involved in planting and marketing a crop.

Economics: Ask what careers are related to growing plants for food.

Language Arts: Have students keep a journal detailing the steps to plant the garden.

INTERMEDIATE



AGRICULTURAL CAREERS

Teacher: Cami Morris

County: Daviess

School: Newton Parish

Grade: Intermediate

Academic Expectations:

2.33 Students demonstrate the skills to evaluate and use services and resources available in the community.

2.36 Students use strategies for choosing and preparing for a career.

1. FOCUS

Student Objectives:

- Students will discuss the different types of jobs related to agriculture.
- Students will practice how to do a proper phone interview.
- Students will work in pairs to create a poster that illustrates what they have learned.

Concepts:

Agriculture, Agribusiness Careers

2. PREPARATION AND MATERIALS

Construction paper

Poster board

Overhead projector

Markers

Phone book

3. TEACH

Introduction:

Begin this lesson by discussing careers in agriculture. Brainstorm ideas with the class, and write the careers on the overhead projector.

Activities:

1. Introduce the steps to conducting a phone interview. Have the students practice introducing themselves to each other.
2. Students should look in the phone book for someone to call. Once they have identified a person in agriculture to call, they will call and make an appointment to talk to that person on the phone. They should be prepared in case the person wants to be interviewed at that time. Students will work in pairs and take turns asking questions.
3. Students will then work on posters to illustrate the careers of the persons they interviewed.
4. Students will give presentations to the class about their careers.

4. CONNECT

Language Arts: Ask the students to write about the following question: "Would you someday want to work in agriculture? What areas are most appealing?"

Science: Ask the students to discuss what scientific knowledge and skills would be important for various careers in agriculture.

5. ASSESSMENT

Select one of the agricultural careers from the presentations. Compare and contrast this career to that of another career of your choice (doctor, teacher, movie star, professional athlete). Include in your answer such areas as education preparation, job responsibility, salary, equipment needed for the job, etc. You may use a Venn diagram for organizing your thoughts.

Scoring Guide

4. Goes beyond significantly beyond 3.
3. Selects careers and makes two comparisons or contrasts of these careers.
2. Selects careers and makes a comparison or contrast of these careers.
1. Selects an agricultural career and career of their choice.

I AM A SEED

Teacher: Debbie Jo Mayes and Kristi Hall

County: Ohio

School: Ohio County Middle School and Beaver Dam Elementary School

Level: Intermediate and Middle

Academic Expectations:

2.6 Students understand how living and nonliving things change over time and factors that influence the changes.

2.10 Students understand measurement concepts and use measurements appropriately and accurately.

1. FOCUS

Student Objective:

- Students will get to know one another and learn important facts about different vegetables, flowers, and herbs.

Background:

The teacher will need general knowledge of plant concepts since this is a first day "get acquainted" activity. Questions during this activity will be addressed as they occur.

2. PREPARATION

seed packets (enough for every student)

Run copies of front and back of seed packet and glue them together. Make a blank spot on the fronts to allow students to write their last names in the blank on their "packets".

straight pins

3. TEACH

Introduction:

This lesson should be presented as an opening activity enabling students to become acquainted as well as learning facts about their plants.

Activities:

1. Hand out copies of seed packets to each student and explain that each seed name is their new first name. They are to write their last name in the blank spot provided on the front.
2. Have students silently read the back of their seed packets.
3. Ask students to choose three facts about their seed.
4. Next, have students write the three facts they have selected.
5. Taking turns students should introduce themselves by presenting the three chosen facts. Remind students that their name during this activity is the name of the particular seed on the seed packet.

4. CONNECT

Art: Students will draw their seed packets on 8 1/2 X 11 sheets of construction paper.

Language Arts: Have students make up a spelling list from the seed packets.

Science: Have students plant their seeds according to information on the back of their seed packets. Students can graph growth on a daily basis, watching for length of time for germination.

PUMPKINS

Teacher: Stephanie Hall and Candi Roten

County: Franklin

School: Collins Lane Elementary

Grade: Intermediate

Academic Expectations:

2.2 Students identify, analyze and use patterns such as cycles and trends to understand past and present events and predict possible future events.

2.6 Students understand how living and nonliving things change over time and the factors that influence the changes.

1. FOCUS

Student Objectives:

- Students will learn about pumpkins and what they need to survive by listening to a story.
- Students will plant their own pumpkin seeds.

Concepts:

Life cycles, interdependence

2. PREPARATION AND MATERIALS

Books: Growing Pumpkins, and Pumpkin Quilt by Deborah Turney Zagwyn.

3. TEACH

Activities:

1. Read the book, Growing Pumpkins, and discuss how pumpkins are grown, and the life cycle of a pumpkin plant. Talk about the parts of a plant and what plants need to survive.
2. Read the book, Pumpkin Quilt, and discuss good climate and temperature for pumpkin growth. Discuss when to plant and harvest pumpkins.
3. Have students save pumpkin seeds from their jack-o-lanterns. Dry and save the seeds so they can be planted next spring. This year's class will plant seeds for next year's class to harvest, etc.

4. ASSESSMENT

Joey wants to make money by growing and selling a crop. His mother has given him money to buy one package of seeds. At the store he sees packages of apple seeds, pumpkin seeds and carrot seeds. Which seed will be the best financial investment for Joey? Explain the reasons why he made his selection.

Scoring Guide

4. Recognizes short germination period, continual supply of seeds, multiple use of seeds, multiple fruits from one seed.
3. Selects pumpkin and gives at least one reason why the other choices were eliminated.
2. Selects pumpkin and cites at least one correct reason for this choice.
1. Selects pumpkin as crop.

FARM TO TABLE

Teachers: Jane Johnson, Betty Maloy, and Judy Vowels

County: Jefferson

School: Hazelwood Elementary

Grade: Intermediate

Academic Expectations:

2.10 Students understand measurement concepts and use measurement appropriately and accurately.

2.30 Students evaluate consumer products and services and make effective consumer decisions.

2.36 Students use strategies for choosing and preparing a career.

1. FOCUS

Student Objectives:

- Students will initiate a connection with a restaurant in the community.
- Students will become familiar with careers available in farming, food processing, food distribution, and selling food in restaurants.
- Students will be able to explain how the productive resources – human, natural, and capital – contribute to food production.

Background:

It is important for students to realize that food does not just suddenly appear in the grocery store or restaurant. There are many steps and many jobs involved in growing, processing, and preparing food. In this lesson students will learn about the complex process of food production. They will also learn some important economic concepts.

Concepts:

Capital Resources, Interdependence, Human Resources, Natural Resources

2. Preparation

Invite one or more people whose jobs are a part of the process of producing food for sale in restaurants to visit the class. Examples might include a farmer, food processor, food distributor, restaurant owner, or chef.

Obtain a few samples or pictures of different foods sold in restaurants and various ingredients that make up these foods. Example might include wheat, tomatoes, tomato sauce, bagels, a picture of a dairy cow, toaster oven, etc.

3. TEACH

Activities:

1. Have the guest that visits your classroom explain the role he or she plays in the food production process. Illustrate the different jobs, skills, and resources that go into food production.

Explain to students that *capital resources* are goods made by workers to make consumer goods to satisfy wants. For example, in the production of food it could include tractors for farmers, equipment for processing food, and even toaster ovens for toasting bread. *Human resources* include farmers, truck drivers, cooks, waiters and waitresses. *Natural resources* are present in nature. Example include land and trees.

Next have students classify what goes into the production of food into one of the three types of resources – capital, human, or natural.

2. As an optional activity take students to a nearby restaurant to learn about the work and ingredients that go into the production of the food that is sold at the restaurant.

3. If a local food distributor is available in your area, take the class on a field trip to the facility. Have students learn about the jobs available and the skills that are required.

4. Collect containers and wrappers from the school cafeteria. Have students conduct research to learn about the origin of food products and the different distributors involved.

5. Create a restaurant in the classroom with students working as chefs, servers, and clean-up personnel. For example, students might make bagel pizzas and serve another class, staff, or a community group.

4. CONNECT

Mathematics: Measure different foods in wet and dry form using metric and standard units.

Social Studies: Study food service careers and all the in-between jobs involved in food production and distribution.

Language Arts: Have students write stories describing the process of producing a food product that is sold in a local restaurant.

Literature:

Aliki (1974). Milk from Cow to Carton. New York: Harper Collins.

Egan, Robert (1997) From Wheat to Pasta. New York: Children's Press.

Everett, Felicity (1993). The Usborne Book of Farm Animals. Tulsa, OK: EDC Publishing

Gibbons, Gail (1991). From the Seed to Plant. New York: Holiday House.

Knight, Bertram T. (1997). From Cow to Ice Cream. New York: Children's Press

Massam-Windsor, Jo (1993). Fibers from Plants. Bothell, WA: The Wright Group.

Precious Soil

Teacher: Debbie Jo Mayes and Kristi Hall

County: Ohio

School: Ohio County Middle School and Beaver Dam Elementary

Level: Intermediate, Middle, and Secondary

Academic Expectations:

1.3 Students make sense of the various things they observe.

2.2 Students identify, analyze and use patterns such as cycles and trends to understand past and present events and predict possible future trends.

1. FOCUS

Student Objectives:

- Students will become more aware of the different types and uses of lands.
- Students will be able to understand the scarcity of land for productive agricultural use.

Background:

Students should have some basic understanding of fractions.

Concepts:

Scarcity of land, land uses

2. PREPARATION AND MATERIALS

apple

knife

posters

The teacher should label the poster with the following statements:

- Oceans of the world, land area, deserts, swamps, Antarctic, and mountain regions where man can live but may not grow food
- Areas of the world that are too rocky, too wet, too hot, or where soils are too poor for production, as well as areas developed by man
- Soil of the earth on which mankind depends for food production

Use these posters to identify each part of the apple you cut.

3. TEACH

Introduction:

Explain that limited resources are an important part of the survival of our environment.

Activities:

1. Cut an apple into four equal quarters. Explain that three parts represent the oceans of the world. The fourth part represents the land area. Refer to the poster as you cut apple in the following steps.

2. Next cut the land section in half lengthwise. Now you have two 1/8 pieces. One section represents land

that has deserts, swamps, the Antarctic, and mountain regions. The other $\frac{1}{8}$ section represents land where people can live.

3. Slice this remaining $\frac{1}{8}$ section crosswise into four equal parts. Each of these four parts is $\frac{1}{32}$ of the original apple. Three of these sections represent the areas of the world that are too rocky, wet, hot, or where the soils are too poor for production. This also includes areas developed by people such as roads, shopping malls, and housing developments.

4. Carefully peel the last section. Explain this small bit of peeling represents the topsoil of our earth on which mankind depends for food production!

5. Ask students to describe their reactions after seeing and listening to the description of this procedure.

4. CONNECT

Art: As an optional art activity, label a series of posters putting the following titles at the top of each poster:

- Oceans of the world
- Deserts
- Swamps
- Mountain regions
- The Antarctic
- A major shopping area
- Productive agricultural land lakes
-

Ask groups of students to draw a picture representing the topic at the top of their posters.

Mathematics: Have students identify the size of each fractional part as the apple is divided.

Science: Have students describe biomes that are represented by parts of the apple.

(This “apple” activity has been adapted from “Apple of Our Eye” Progressive Farmer, March 1996).

MIDDLE AND HIGH SCHOOL



BEAN AND CORN SEED MEASUREMENTS

Teacher: Larry Lose

County: Jefferson

School: Seneca High School

Grade: Middle and High School

Academic Expectations:

2.10 Students understand measurement concepts and use measurements appropriately and accurately.

1. FOCUS

Student Objectives:

- Students will demonstrate an understanding of mathematical procedures.
- Students will demonstrate an understanding of measurement concepts.

Background:

Students should have prior knowledge of ratios, percentages, conversions, and standard measurement.

Concepts:

Volume vs. Weight

2. PREPARATION AND MATERIALS

1 lb. Bean seeds

1 lb. Corn seeds

Handout

1 pint measure

1 quart measure

Scale

1. Assemble enough bean and corn seeds for each student (or each team) to have 1 lb. each.
2. The scale must measure in ounces and be able to weigh at least 16 ounces.

3. TEACH

Prior to this lesson, discuss the difference between mass and volume. Let the students conclude when it would be appropriate to use a mass (weight) measurement and when it would be appropriate to use a volume measurement. Introduce various scenarios such as a homeowner buying birdseed for his feeders, a farmer buying seed to plant, a cook buying dried beans for a meal, etc.

Activities:

See student activity "Bean and Corn Seed Measurements."

BEAN AND CORN SEED MEASUREMENTS

How many seeds are there in each of a one-half lb. or a one-lb. bag of bean or corn seeds?

Procedure:

1. Count out 25 seeds and weigh them.

What is the weight?

_____ oz. (beans)

_____ oz. (corn)

2. Measure 1 pint of seeds and weigh them.

What is the weight?

_____ lb. _____ oz. (beans)

Convert to ounces _____ oz.

What is the weight?

_____ lb. _____ oz. (corn)

Convert to ounces _____ oz.

Count the seeds before returning them to the bag.

3. Measure 1 quart of seeds and weigh them.

What is the weight?

_____ lb. _____ oz. (beans)

Convert to ounces _____ oz.

What is the weight?

_____ lb. _____ oz. (corn)

Convert to ounces _____ oz.

Count the seeds before returning them to the bag.

4. How many seeds are there in a quart?

_____ beans _____ corn

5. Do the corn and bean seeds weight the same? Why/Why not?

6. Does the pint hold the same number of bean and corn seeds? Why/Why not?

7. Using the weight of your 25 seeds, find the number of seeds in one pound of beans and in one pound of corn seeds.

bean seeds / lb.

corn seeds / lb.

8. How many groups of 25 seeds are in a 1 lb. bag of corn? Of beans?

How many in a 1/2 bag of corn? Of beans?

4. CONNECT

Language Arts and Mathematics:

Have the students respond in paragraph form to a scenario such as:

1. A farmer wishes to plant fifty rows of sweet corn. His rows are one hundred yard long each. Using the

spacing information on the back of the seed packet for sweet corn and the information you learned from this activity, determine how many pounds of sweet corn this farmer will have to purchase to plant his rows.

2. You are a high school science teacher with 30 students in your class. You want them to work in teams of two to do an activity requiring 25 bean seeds per team. How many ounces of bean seeds will you have to purchase for this class?

Geography and Social Studies:

Have the students research the country of origin of corn and beans. Is wild corn the same in description to cultivated corn? What has been the historical significance of cultivated corn?

Community:

Invite a grain farmer to visit the class. Ask the farmer to show, mathematically, how he determines how much seed corn and soybean seed to buy.

Editor's note: This lesson is from a unit title "Germination Test" by Larry Lose. The unit contains several lessons that can be obtained Kentucky Agriculture and the Environment in the Classroom, P.O. Box 814, Frankfort KY 40602-0814.

CONCEPT OF AN ACRE

Teacher: Cami Morris

County: Daviess

School: Newton Parrish

Level: Intermediate and Middle

Academic Expectations:

2.9 Students understand space and dimensionality concepts and use them appropriately and accurately.

2.10 Students understand measurement concepts and use measurements appropriately and accurately.

1. FOCUS

Student Objective:

- Students will understand that land area is measured in acres, and will measure an acre of land.
- Students will also construct problems for their classmates to solve based on their experiences with the acre.

Background:

Begin with review of perimeter and area. Next, practice finding both of these on geoboards. Find the area and perimeter of parts of the classroom using measuring devices.

2. PREPARATION AND MATERIALS

Geoboards

Overhead projector

Variety of measuring devices

Stakes to mark corners of acre

Clicking wheel that measures feet

Stopwatch

Rubber bands

Overhead calculator

Drawing of acre dimensions

3. TEACH

Activities:

1. Look to see how big an acre is using an overhead calculator.
2. Find the square root to determine the dimensions of the acre.
3. Hand draw an acre.
4. Go outdoors and measure an actual acre. Students will take turns measuring the sides and putting the stakes in place.
5. Time students on how long it takes them to walk around and across the acre.

4. CONNECT

Mathematics:

Organize students into pairs and have them write mathematics and problems to solve about the acre.

Explain that acres come in a variety of shapes and are sometimes dependent on the contour of the lands, improvements on the land, or streams. Advanced students might determine the number of feet in an acre when the acre is in the shape of a circle, square, rectangle, triangle, etc. Students might also figure how many acres there are in a tract of land that has several acres.

5. ASSESSMENT

Use grid paper to create different shapes that represent the area of an “acre”. Select one acre, not the shape of a square or a rectangle, that would be the next best option for a farmer to use for crops. On your acre, show how the farmer might arrange his crops.

Scoring Grid

4. “3” and explains placement of crops.
3. “2” and shows placement of crops(s).
2. “1” and explains why it is an acre.
1. Area of selection equals an acre.

FARM TO MARKET

Teacher: Letitia Hughes

County: Metcalfe

School: Metcalfe County Middle School

Level: Middle

Academic Expectation:

2.8 Students understand various mathematical procedures and use them appropriately and accurately.

1. FOCUS

Student Objective:

- Students will mathematically compare values of agricultural products.

Background:

Students should be able to identify important farm products and explain the different ways they are valuable to communities and individuals.

2. PREPARATION AND MATERIALS

Examples of agricultural products such as steak, pork chops, milk, leather belt, jam, cotton ball, jeans, apple sauce, etc. As an option, select agricultural products that are representative of the products in your county or region.

- Price list of the selected items
- The section of newspaper that provides prices of farm products
- Dairy farmer's check stub

Before class, find the price of each agricultural product used in this lesson.

3. TEACH

Introduction:

1. Display agricultural products for students to evaluate. Encourage students to *predict* the price for each item and record their data.
2. Initiate a class discussion and check student predictions using the price list.

Activities:

1. Instruct students to list the plant or animal from which the agricultural product originated. Discuss student ideas and reveal the correct answers.
2. Utilize the section of the newspaper that has commodity prices for slaughter cattle and hogs.
3. Show students how to read current commodity prices.

Commodities are objects produced for consumption. They include raw foodstuffs such as wheat, and other materials such as cotton, petroleum, and gold. Several newspapers in Kentucky report the current prices of farm commodities including corn, wheat, soybeans, and livestock. To illustrate, on June 23, 1998, the Louisville Courier-Journal gave the following prices per bushel for Number 2 yellow corn: at Louisville, \$2.46; at Mammoth Cave, \$2.50 to \$2.60; and Pennyryle, \$2.50 to \$2.56.

4. Discuss prices per weight.
5. Calculate the total amount a farmer would receive for several different animals (e.g., How much would a sow bring if she sold for 40 cents per pound, and she weighed 428 pounds?). Create and complete additional examples until students master the skill.
6. Compare the per pound price in step 5 to the retail price of a 16 ounce steak or a pork chop.
7. Ask students to give reasons for the differences in price.
8. Display a copy of a dairy farmer's check stub.
9. Discuss the price per hundred weight of milk (one gallon equals eight pounds).
10. Calculate the milk production into gallons and the farmer's price per gallon.
11. Closure: Compare the price consumers pay for milk at the supermarket to the price farmers receive. Discuss reasons for the difference.
12. Evaluation: Students will develop a portfolio entry comparing prices.

4. CONNECT

Language Arts:

Develop a comparing/contrasting portfolio entry. Students might also write a paper explaining how to read market data in a newspaper or how to interpret data on a dairy check. Another suggestion would be for students to select risk factors farmers encounter and explain how risk affects the farmer as well as the consumer. Discuss how farmers handle risk and try to remain profitable.

Mathematics:

Use the data obtained in the lesson to complete an investigation, application, or problem solving entry for portfolios.

Science:

Introduce students to the biological process in a cow during milk production.

Social Studies:

Students can evaluate and graph the following data:

Average weight of cattle or average milk production in Kentucky over the past 10 years

Kentucky cattle or milk production compared to the other states, or

Production statistics from the students' county compared to those of other Kentucky counties

Obtain data from Kentucky Agricultural Statistics, prepared by the Kentucky Agricultural Statistics Service, Kentucky Department of Agriculture, Frankfort, KY 40601.

5. ASSESSMENT

Over time and in various locations, the prices of farm products fluctuate. On the same day, lettuce in Kentucky costs \$1.29 and a similar head costs \$.39 in California. A gallon of milk for \$2.49 in Kentucky many on the same day be purchased for \$.89 in West Virginia. A small basket of strawberries may cost \$.99 in

the spring and the same size costs \$1.49 in the winter.

Select a farm product and identify factors that might influence changes in its cost to the consumer. Analyze how the price fluctuation might affect these groups: the farmer, the merchant, and the consumer.

Scoring Grid

4. "3" and three causes and how all three groups might be affected.
3. "2" and three causes or how all three groups might be affected.
2. "1" and two causes or how two groups might be affected.
1. Selects product and a realistic cause. Explains how one group might be affected.

SEED CATALOG

Teacher: Tracy Fugate

County: Anderson

School: Anderson County High School

Level: High School

Academic Expectation:

1.1 Students use reference tools such as dictionaries, almanacs, encyclopedias, and computer references programs and research tools such as interviews and surveys to find the information they need to meet specific demands, explore interests, or solve specific problems.

1.10 Students organize information through development and use of classification rules and systems.

1. FOCUS

Student Objective:

- Students will be able to use reference books to gather information about different plants.
- Students will be able to enter scientific information in a database.
- Students will be able to merge computer files.

Background:

Students will work in small groups and choose plant themes such as vegetables, herbs, wildflowers, foreign plants, Kentucky native plants, farms crops, alphabet garden (one flower from each letter of the alphabet), or specialty gardens (i.e. gardens designed to attract birds or butterflies).

Concepts:

Classification, seed germination and plant growth requirements, data entry, computer file management.

2. PREPARATION AND MATERIALS

Reference books

Gardening magazines

Seed packets

Access to computers and printers

- Assign students to small groups of three or four.
- Have resource materials, computers and printer easily accessible to students.

3. TEACH

Activities:

1. Ask students to choose a plant theme from among those mentioned in the Background section above.
2. Tell students to select five to ten plants in their theme.
3. Ask students to gather the following information for each plant and enter it into a database:

Scientific name, common name, germination depth, typical plant height, spacing between plants, sunlight needs, use, description, other pertinent information necessary for planting.

4. Have students create a "generic seed catalog" page or web site on the word processor.

5. Ask students to merge the database and word processing files and print out a separate page for each plant. As an option, a picture of the plant might be added at the bottom.

4. CONNECT

Agriculture:

Let student groups dig and plant small gardens using their chosen plants.

Art:

Allow the art instructor to teach the students how to draw or paint the pictures for the seed catalog pages.

Computer Science:

Allow students to experiment with various font, type sizes, and computer graphics for an attractive catalog appearance.

Ecology:

Ask students to select three plants and answer these questions for each: What does it contribute to its ecosystem? What does it require from its ecosystem? What would be the effect of its extinction on the ecosystem?

Language Arts:

Have students write one or more paragraphs explaining how to merge two computer files.

Social Studies:

Have students choose one of their plants and learn about its historical significance (e.g. Irish Potato Famine).

SOILS

Teacher: Larry Lose

County: Jefferson

School: Seneca High School

Level: Middle and High School

Academic Expectation:

5.1 Students use critical thinking skills such as analyzing, prioritizing, categorizing, evaluating, and comparing to solve a variety of problems in real life situations.

1. FOCUS

Student Objective:

- Students will compare soil at their school with the soil from a nearby farm.

Background:

Students will collect samples and make comparisons. Based on the data obtained, they will be able to draw conclusions about different characteristics and uses of different soil types. This lesson can be part a larger environmental unit and/or it can be used for students to learn more about the area where they live.

Concepts:

Soil, Scientific Method

2. PREPARATION AND MATERIALS

Prior to starting this activity, obtain soil pluggers (metal pipes and cans opened at both ends can also be used), screen sieves, soil collection containers, timers, water bottles with volume measures on the sides, and notebooks for students to record their data.

3. TEACH

Activity one: Compact soil

Questions to consider:

1. How does soil around your school compare to the soil at a local farm?
2. How does compact soil effect the grass and tree roots?
3. Does water run through hard or compacted soil the same as it does through soil that is not compacted by people walking on it? What is the difference at the farm?
4. How does water move through different soil types?

ACTIVITY ONE: SOIL FROM YOUR SCHOOL

1. Take 4 or 5 sample readings from several locations around school grounds. To take a sample, take pipes or cans (that are marked every $\frac{1}{2}$ inch or in $\frac{1}{2}$ inch increments) and drive them into the ground to a depth of one inch. (This depends on how soft the ground is – whether it is moist or dry.) Is it hard because of compaction? (Soil class and foot traffic will determine if it is hard or soft. Underground debris can make it difficult to get into the ground.)

2. Fill the container with water. **Measure the amount of water used in each container.** (This may be done by using a two-liter bottle.)
3. Take a one- or two-liter bottle and mark into 50 ml increments. Use permanent marker. Fill bottle to the top.
4. Fill the containers that were driven into the ground to the top with water. **Record the amount of water used.**
5. Record the amount of time it takes for the water to go into the ground.
6. Let the water sit overnight or for 30 minutes depending on how much time is available and how fast the water moves. **Record the amount of water that has dropped and the time it takes to go into the ground.**
7. Fill the containers to the top a second time. **Record the amount of water used.**
8. Record the time it takes for the water to go into the ground the second time.
9. This may be repeated as many times as you wish. Is there a difference in the amount of time it takes for the water to go down?
10. Compare the soil or ground where people walk (instead of using the sidewalks) to an area that is not walked on. Note the differences in the soil characteristics.

Questions to consider:

- a. Does it make a difference with people walking on the grass instead of the sidewalk? Is the ground harder? Does it take more time for water to go into the ground?
 - b. Is there a difference in the areas where people do not walk and where people do walk on the grass such as beside the sidewalk? Why?
 - c. Is there a difference in the quality of grass?
 - d. How does a compacted soil (one that doesn't take water well) effect tree roots, since most of the tree feeder roots are in the top 18 inches of the ground? How would it effect grass roots?
- (The area that has foot traffic should be harder, have less grass, and more difficult to sample with pipes or cans. This indicates to students that they should use the sidewalks instead of taking shortcuts because their shortcuts hurt the grass, tree roots, and soil.)
- e. Look at a football field. How does the soil differ between the 50 yard line (in the middle of the field) and the 10 yard line?
 - f. Where grass will not grow, how does it compare with an area where grass is growing well? What is the difference and why?

Note: There are several steps here. One may do any part of the tests and record results to plot or an entire unit could be developed.

Note: Ideas of where to take soil samples and what to look for. Compare the soil or ground where people walk instead of using the sidewalks to an area that is not walked on. Notice the differences in the soil characteristics.

ACTIVITY TWO: SOIL AT A FARM

Take samples from a farm. Examine them to see if there are differences in the soil conditions at the local farm and those of the school. Make arrangements before doing this. Areas to test: a valley where there is little traffic, a feed area, a corn or soybean field, and a pasture field.

1. Repeat **ACTIVITY ONE** on the farm.
2. Plot the different findings and compare the difference between school grounds and farm. What is the difference and why?

(The area that has foot traffic should be harder, have less grass, and will be harder to take samples with the pipes or cans. This indicates to students that they should use the sidewalks instead of taking shortcuts because their shortcuts hurt the grass, tree roots and soil.)

NOTE: There are several steps or tests here. One may do any part of the tests and record results or an entire unit could be developed.

NOTE: **Ideas of where to take soil samples and what to look for.** Compare the soil or ground where people walk instead of using the sidewalks to an area that is not walked on. Notice the differences in the soil characteristics.

ACTIVITY THREE: TAKING AND USING SOIL SAMPLES

1. Students may want to use a spade: first cut out the square section; next make another cut about 1 inch from the first cut. Place soil in a bag. Using a soil probe or an auger, take several plugs of soil from different areas. Push the soil probe into the ground to a depth of 5 to 6 inches and put plug into a bag. If an auger is used, screw it into the ground until the auger part is completely in the soil and then pull it out, putting the soil sample into a bag.
2. Repeat until the hole is 6 inches deep.
3. Collect about a one pound coffee can full or a gallon can full of soil.
4. Determine the type or class of each sample of soil (e.g. clay, sandy-loam, loam, etc.) by looks.
5. Let soil samples dry. Do not put in the oven to dry.
6. Sift the soil through different sized screens.
7. Put each sample into a long glass tube. Keep each sample separate (by itself). **Mark the top of the soil** in the tube and stand on end. Tubes should be marked in one inch increments.
8. Use a funnel and a measured amount of water. Pour water into the tube of soil. Keep records on the amount of time and water it takes to get the water in and through the tube of soil.

Questions to consider:

- a. Are there any differences in the types of soil, compared to the amount of water it takes for each?
- b. Are there differences in the time it takes for water to run through to the bottom?
- c. Are there differences in the amount of water each sample can hold when water stops running out of the bottom?

4. CONNECT**Community:**

Interview a local farmer. Ask the farmer about differences in soils and the importance of good soils to the production of crops.

Language Arts:

Ask students to write short essays. In the essays they should summarize and draw conclusions about what they have learned.

Mathematics:

Use the measurements obtained from some of the different samples and plot these measurements on a bar graph or line graph to show the differences.

5. ASSESSMENT

It is said that "perfect" soil has: 25% sand, 35% silt, 35% clay, and 5% organic matter. A group of students performed a soil analysis at the site of a proposed recreation park. The results of the soil analysis done by the class showed the park soil to include 35% sand, 20% silt, 34% clay, and 2% organic matter.

Based on this data, determine which of the following might be located in this park without making any changes to the soil: a meeting hall, softball field, playground, Olympic size pool, flowers and shrubs. Justify your selections. Your answer should include why you excluded others.

Scoring Grid

- 4. Makes two or more appropriate choices and two or more exclusions with justifications.
- 3. Makes two appropriate choices and one exclusion with justification.
- 2. Does "1" and includes one exclusion.
- 1. Makes one appropriate choice with justification.

Adapted from PRISM UNIT **CHANGE OVER TIME** – developed by:

Clara Mackin - Nelson County Schools

Becky Smith - Mercer County Schools

TREES ARE USEFUL

Teacher: Ralph Combs

County: Perry

School: Perry Central High School

Level: Middle School and High School

Academic Expectations:

2.5 Student understands that under certain conditions nature tends to remain the same or move toward a balance.

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

1. FOCUS

Student Objective:

- Students will be able to list and explain many different ways trees are useful to people.

Background:

Trees serve a multitude of purposes. Trees are especially important to Kentucky. Almost one-half of Kentucky's 25.4 million acres are in forests. The value of Kentucky's forest products exceeds one billion dollars annually. This lesson engages students in learning about the many products and services provided by trees.

2. PREPARATION AND MATERIALS

This lesson contains five different background sources of information for students to read. They are "Some Things We Get from Trees", "Products from a Typical Sawlog", "Most Woods have Specific Uses", and "Kentucky's Trees-Puttin on Airs".

Read these background readings and select one or more to duplicate and give to each student.

Next, duplicate "Trees Can be a Crop", "Forest Finds", or prepare your own activity for students to learn about products and services from trees.

3. TEACH

Introduction:

These activities may be used in a variety of ways, such as homework assignments, cooperative groups, or individual inclass study assignments. Encourage students to be thoughtful and creative as they try to think about the many uses of wood. For example, students should include the enjoyment trees provide people and how they enhance and protect the natural environment.

Activities:

1. Distribute one or more of the different readings and assign students to read the material provided.
2. Give each student "Trees can be a Crop", "Forest Finds", or a teacher-made handout.
3. Instruct students to complete the list of the different products and uses of trees.

4. As a conclusion to this activity, have students or groups of students compare their lists.
5. Ask which products and uses were most frequently named.

4. CONNECT

Community:

Invite a district forester to come to the class and share information about the different trees that are growing in your area and how the trees are used.

History:

Have students find examples of the use of trees in history or illustrations when scarcity of trees caused special problems for people.

Literature:

Trees have often had significant effects in literature. Ask students to find illustrations of this in fiction and poetry.

Science:

Obtain a good tree identification source that has several Kentucky species and have students identify different Kentucky trees. How are these trees used in Kentucky?

SOURCES

Kentucky's Useful Forests - 4H 4DF-02P0

University of Kentucky College of Agriculture

County Extension Service

Objectives and lesson plans for 33 forestry related activities (also communication skills events as demonstration and speech competition, project completion competition for State Fair entry).

High School Teachers Resource Kit

Kentucky Division of Forestry

Department for Natural Resources and Environmental Protection

Frankfort, Kentucky

(Various lesson plans for forestry.) Contact your local state forestry department.

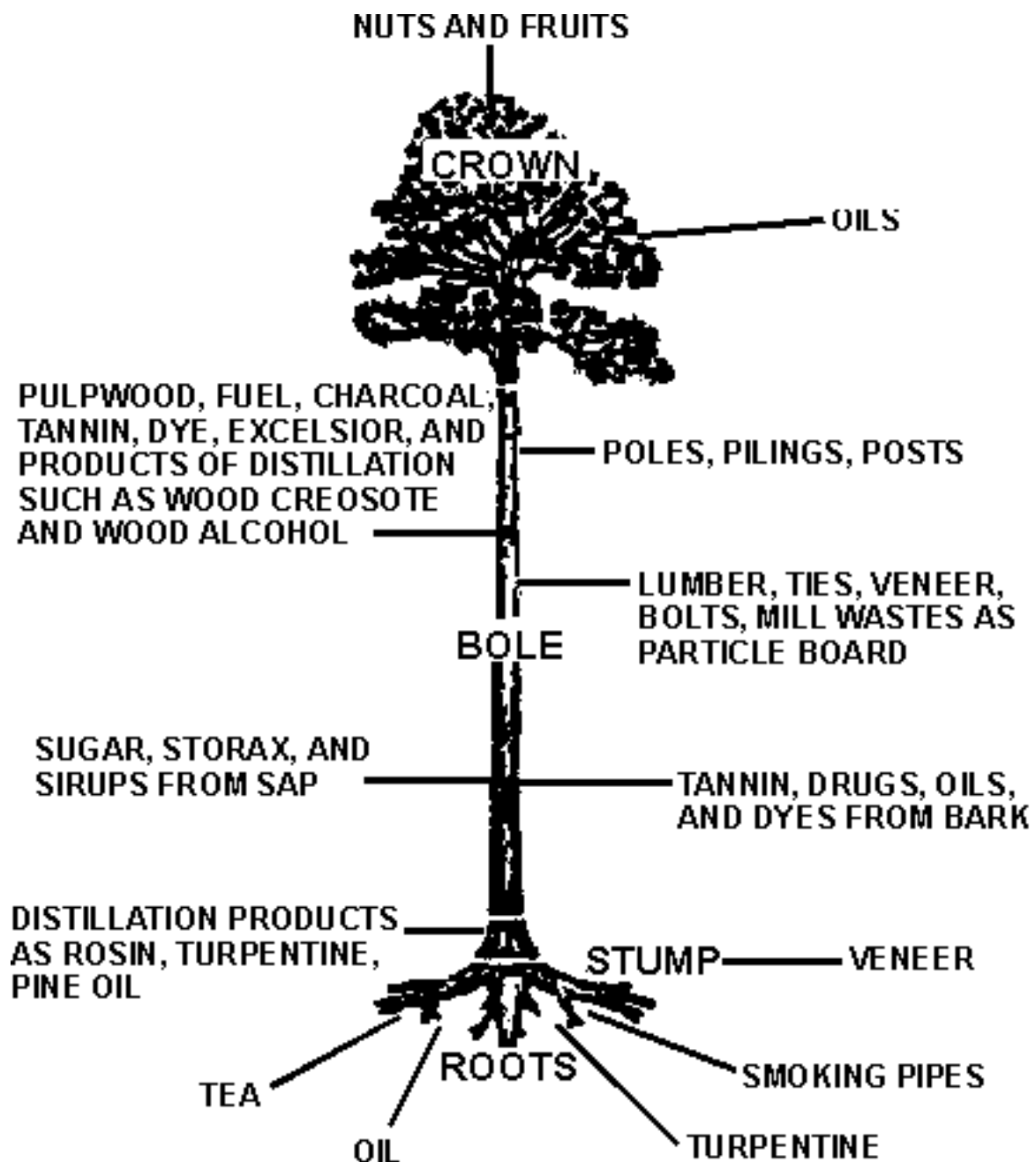
Forests and Forestry' in Kentucky

General Forestry Information

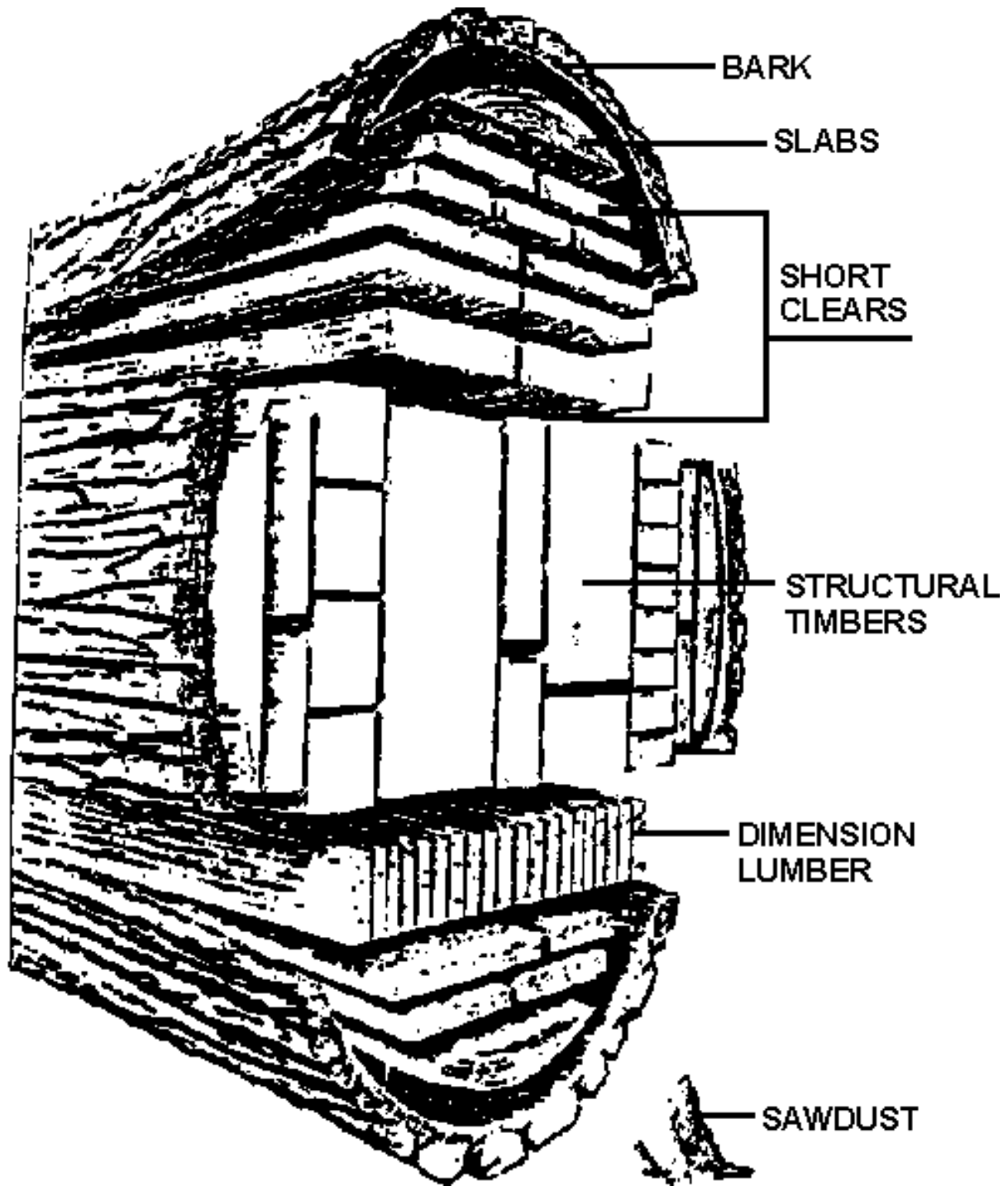
University of Kentucky College of Agriculture

County Extension Service

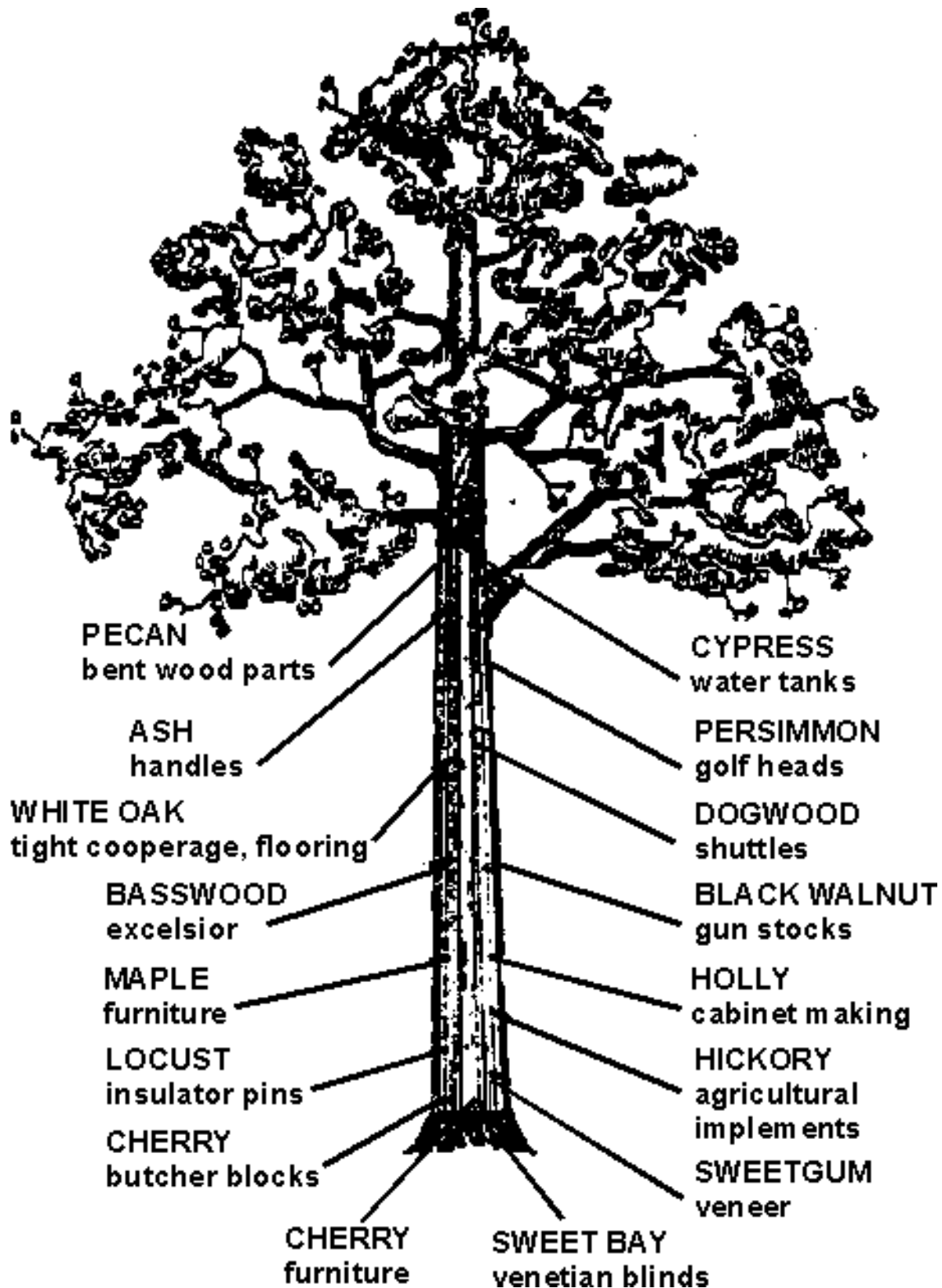
SOME THINGS WE GET FROM TREES



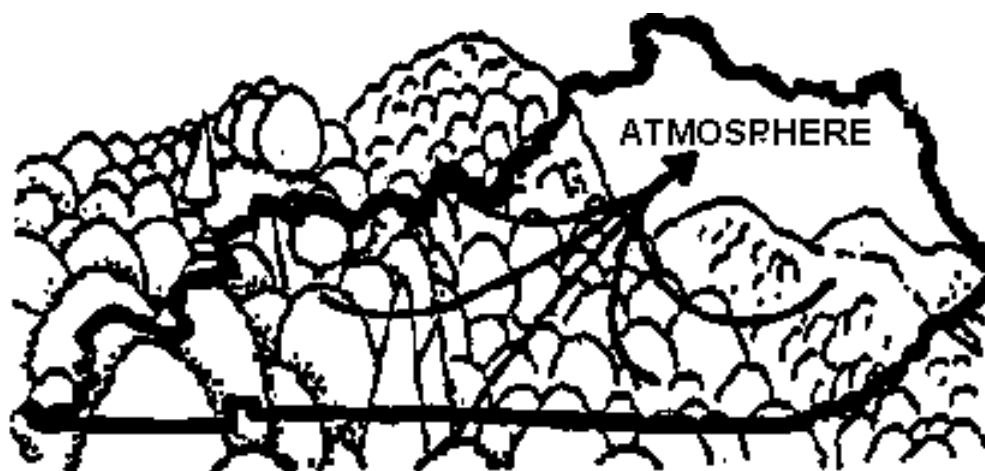
PRODUCTS FROM A TYPICAL SAWLOG



MOST WOODS HAVE SOME SPECIFIC USES



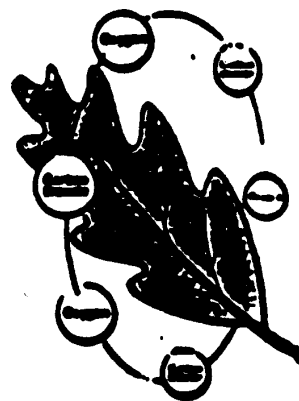
KENTUCKY'S TREES – PUTTIN' ON AIRS



1. Trees take in carbon dioxide (CO_2) from the atmosphere and combine it with water (H_2O) in their leaves. This combination produces sugar ($\text{C}_6\text{H}_{12}\text{O}_6$) to fuel tree growth, and pure oxygen that is released by leaves into the air as a by-product. (This process is called "photosynthesis".)
2. All the carbon dioxide in the stratosphere is filtered through green leaves every 300 years.
3. Trees are natural "carbon storage modules". They capture carbon from the atmosphere in their wood, where it is stored as long as the wood is not burned or rotting.
4. Kentucky's hardwoods are over 50% carbon. Young, vigorous growing trees are the best "carbon storage modules".
5. A typical, healthy tree removes 25 to 45 pounds of carbon from the air each year.
6. An average acre of trees can absorb 2.4 to 5 tons of carbon per year. The 728 million acres of trees we have now in the United States can remove several billion tons of carbon dioxide a year from the air. (More than five billion tons of CO_2 are released each year by burning fossil fuels.)
7. An average of 78 trees per person are required to remove our civilization's current daily carbon dioxide production.
8. It takes approximately 20 large trees to remove the carbon dioxide emitted from a vehicle each time it burns 5 gallons of gas.
9. It takes one large tree to remove the carbon dioxide exhaled by the average person during the day.
10. For every pound of wood a tree grows, it consumes about 2 pounds of carbon dioxide and releases about a pound and a half of oxygen. (The average person consumes about one pound of oxygen every day.)
11. An acre of young, vigorously-growing trees provides the daily oxygen needs of 18 people.

12. Mature and over-matured trees are less efficient producers of oxygen, giving off almost the same amount of carbon dioxide as they take in.
13. Trees "eat smog" because their leaves collect air-borne particles and absorb pollution gases. Each Fall these dust-busters are recycled as the trees await their Spring burst of fresh, clean, pollution-fighting foliage.
14. An acre of trees can capture and remove 13 to 20 tons of dust and gases each year from the atmosphere.
15. A large sugar maple can remove as much airborne lead as is emitted by automobiles burning a thousand gallons of gasoline.
16. The air under trees is measurably cleaner and purer due to their production of oxygen, combined with the consumption of carbon dioxide, absorption of smog, and removal of airborne dirt particles.
17. The air under the canopy of a young, healthy tree may be as much as 20 degrees cooler than in the sunlight - a net cooling effect equivalent to 10 room-size air conditioners.
18. Just 3 trees around a house can cut air conditioning needs 10 to 50 percent. In winter, trees used as wind breaks near a house can cut the wind chill factor and help in heating costs.
19. Urban "heat islands" (such as concrete covered intersections absorbing reflected sunlight from surrounding buildings) can be cooled up to 5 degrees F when shaded by trees.
20. Trees are highly effective noise reducers. Tree barriers can reduce noise by over 50% – reducing levels of a heavily travelled highway to those of a suburban street in the quiet of evening.

Compliments of
Kentucky Division of Forestry
Natural Resources and
Environmental Protection Cabinet
Frankfort, Kentucky
40601



Name _____

TREES CAN BE A CROP

Forest stewardship can mean the profitable production of successive crops of trees. As long as trees are putting on good growth and remain healthy, they often can be left to grow. Trees that are overripe, slowing down in growth, or whose leafy topes ("crowns") are starting to crowd each other can be harvested for use at home or sold to wood industries to manufacture into the countless wood products and by-products we use every day. List five uses for wood:

1. _____
2. _____
3. _____
4. _____
5. _____

Before the timber is sold, all trees that are to be cut should be selected according to their maturity, health, and the overall needs of the forest environment. The trees selected for harvest should be marked somehow so both the seller and the buyer are clear on what trees are to be removed. There should be a written sales agreement signed the buyer and seller. Professional foresters are available to help the landowner with these procedures.

How much a landowner can get for selling timber depends on many factors: how good his timber is, tree size, how much timber is being sold, how near it is to log yards and sawmills, ease of logging, condition of haul roads, and timber supply and demand.

FOREST FINDS

Objective: Identify some of the forest products we use every day.

Ages: Primary and Intermediate

Subjects: Science and Social Studies

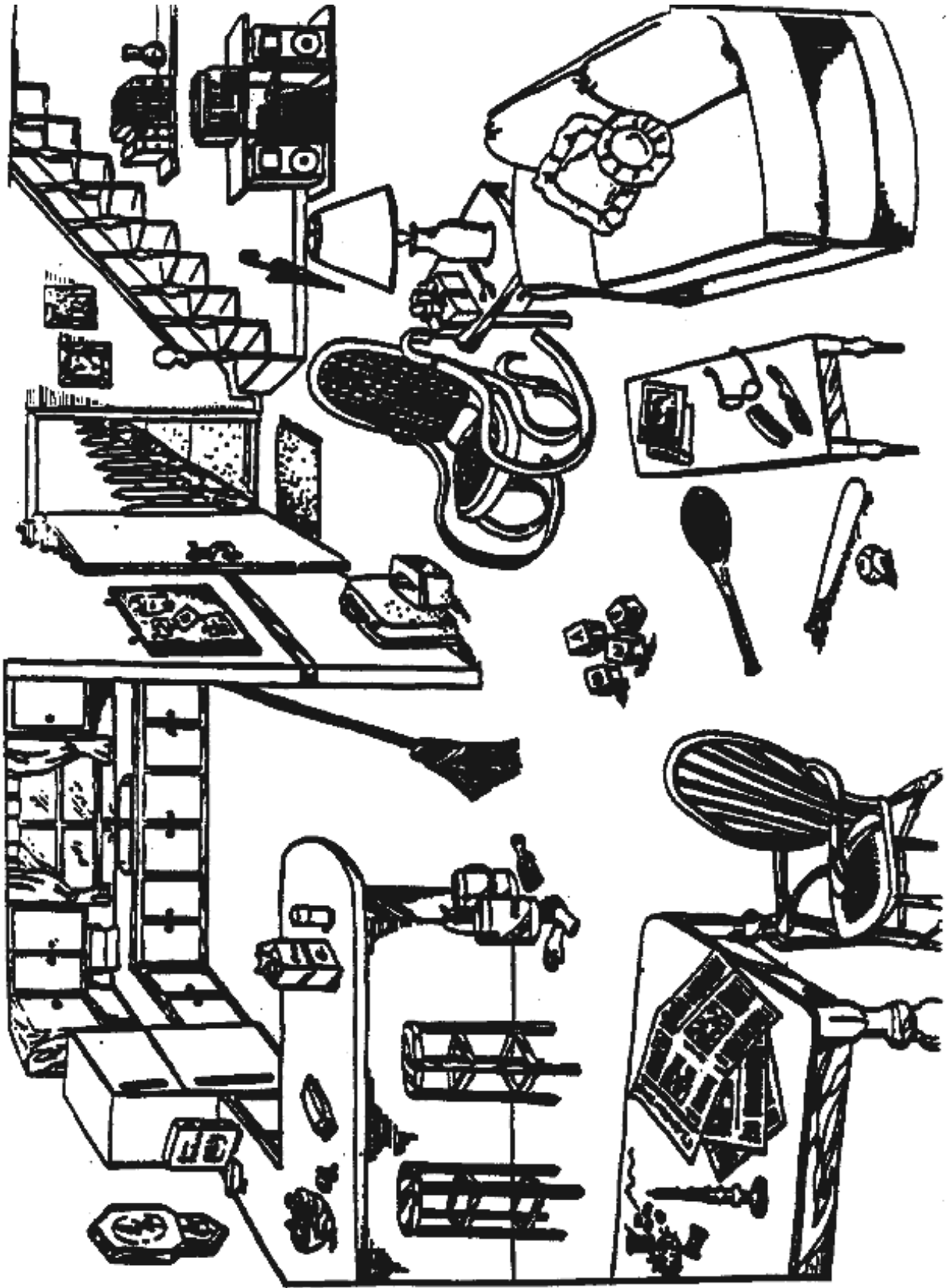
Reprinted with the permission of the National Wildlife Federation from the Trees are Terrific issue of NatureScope. For more information about NWF and our education programs please call 1-800-822-9919.

It's hard to imagine what life would be like without forests. We use the products we get from them to make everything from cardboard to chewing gum. In this activity your students can discover just how big a role forests play in their daily lives.

Give each student a copy of the next page and tell them that there are more than 40 forest products in the picture. Ask them to circle as many as they can find. When they're done, discuss the answers and let them color the picture. As a follow-up activity, ask the students to list all the forest finds they can think of in their own homes.

Answers:

Wood products—bannister, baseball bat, blocks, bookshelf, broom handle, bulletin board frame, cabinets, chairs, clock, counter, door, fence, bowl, wall molding, paintbrush handle, picture frames, sofa, stairs, stereo cabinet and speakers, spools for tread, stools, tables, tennis racket, umbrella handle, window frame, wood inside walls; Bark products—baseball (has cork center), bulletin board; Paper products—books, candy wrapper, cereal box, gift wrapping and box, magazines, milk container, newspaper, notes on bulletin board, paper towels, record album covers; Foods—nuts, chocolate bar; Other products— buttons, comb, curtains, eyeglass frame, hairbrush handle, luggage, paint, pillows, rug, upholstery on sofa. (Cellulose, the major component of the cell walls of trees and other plants, can be added to certain substances to make plastics. And tree saps can be turned into paint and other products.)



WHAT'S MY BUDGET?

Teacher: Karin S. Weddle

County: Casey

School: Casey County Middle School

Grade Level: Middle and High School

Academic Expectations:

2.18 Students understand economic principles and are able to make economic decisions that have consequences in daily living.

2.30 Students evaluate consumer products and services and make effective consumer decisions.

1. FOCUS

Student Objective:

- Students will develop an understanding of the expenses involved in producing an agricultural crop.

Background:

It is suggested that students be familiar with crop pests and diseases, soil sampling, and the process used to determine fertilizer and time recommendations.

Concepts:

Choice, budgeting

2. PREPARATION AND MATERIALS

Calculator

"What's My Budget?" packet

Peck of tomatoes

Overhead projector (optional)

Place students in groups of three or four. Each group should have a copy of the packet; however, you may prefer to provide a copy for each student. One may also place the packet on an overhead projector. It is suggested that the teacher contact the local county agriculture agent to update prices given in the lesson. This person may be able to provide other suggestions for this lesson.

3. TEACH

Introduction:

In order to motivate students, present a peck of tomatoes and challenge students to hypothesize about the cost to produce the tomatoes.

Activities:

1. Ask students to read sections A-J in the "What's My Budget" packet. It is very important that any questions are discussed.
2. As a class, discuss the "task" described in section K.
3. Circulate throughout the classroom assessing groups while they complete the task.
4. Closure: Groups will present their final budget to the class. They are to explain why they selected specific options (plant and mulch) and report their total profit or loss. They also need to discuss their experiences.

STUDENT PACKET: A

WHAT'S MY BUDGET?

Introduction:

There are many important decisions a farmer must face when preparing for the production of a crop. The farmer must choose the most efficient site for the crop, determine the best type of fertilizer, and use the correct amount of fertilizer and lime. There are other important decisions to make with a variety of options to choose from.

In the following activities, your group will make decisions for the preparation of a half-acre crop of tomatoes. Your group will decide which type of tomato to purchase as well as the type of plastic mulch to utilize. The cost of chemicals and labor must be calculated, along with other expenses. Your group will determine the cost of raising a half-acre of tomatoes by calculating the expenses involved in this crop. There are 5,000 tomato plants per acre and your crop is to be one-half acre.

PLANTS

There is a wide price range the farmer must evaluate when selecting the plants to be used for the tomato crop. The plants differ one from another according to the size of the rootball. The rootball size is determined by the length, width, and depth of the clot around the root.

The size of the rootball has a tremendous effect on the production of the fruit. The larger the rootball, the more efficient the plant grows, which in turn, will increase the yield. The rate of maturity will also increase. This will allow the farmer to harvest during the early market which is usually more profitable than the later markets. The problem with plants with the larger rootball size is that the cost is greater.

Your group needs to evaluate the Price Chart in Student Packet B and the return chart to decide which plants to purchase.

STUDENT PACKET: B

Price List

Rootball Size	Packaging	Price
0.8X0.8X1.75	1200 plants/box	\$30.00
1.1X1.1X2.85	700 plants/box	\$40.00
1.5X1.5X2.5	450 plants/box	\$36.00
2.0X2.0X3.0	270 plants/box	\$91.00

Packaging charge is \$.80 per box

Average Price Per Pound

Plant	Average cost/pound	Average pound/acre
0.8X0.8X1.75	\$0.20	25,000
1.1 X1.1X2.85	\$0.24	30,000
1.5 X1.5X2.5	\$0.28	35,000
2.0X2.0X3.0	\$0.32	42,000

STUDENT PACKET: C

WHAT'S MY BUDGET?

Irrigation

In order to help assure the farmer that he or she will have a profitable year, it is very important the farmer has an effective irrigation system. An irrigation system includes plastic mulch, trickle tape, a water pump, and a sand filter.

The plastic mulch is used to help prevent the growth of weeds, which can take important nutrients away from the tomatoes. It also helps to maintain moisture in the soil, which increases the availability of water. There are two types of plastic mulch; degradable and nondegradable

Your group will be using a trickle tape system. This system is more effective in preventing water loss through evaporation, since the water is dispersed underneath the plastic mulch. By the use of the system, the farmer can also fertilize through the irrigation. This method is called fertigation. It is beneficial because the plants receive fertilizer more directly, which decreases the waste of fertilizer. The farmer can also more easily monitor the time and the amount of fertilizer that is to be distributed to the plants.

Although a water pump and a sand filter are needed to complete your irrigation system these items will be discussed later with the other equipment and machinery. The water pump and the sand filter can be used year after year.

The needed components of an effective irrigation system are discussed on the following page. Your group needs to evaluate the information and continue your budget for a half-acre crop of tomatoes.

STUDENT PACKET: D

WHAT'S MY BUDGET?

Plastic Mulch

There are two types of plastic mulch currently available: degradable and nondegradable. The degradable mulch is more expensive; however, it will rot in the soil and does not have to be taken up after harvest. This product is also environmentally friendly. The nondegradable mulch is cheaper, but it is more harmful to the environment. It is suggested that a mulch lifter be purchased to remove the nondegradable mulch after harvest. If not removed, the plastic will remain in the soil and create problems for the farmer when it is time to utilize the land again.

There are 4,000 feet of plastic in a roll. It is estimated that it takes 8,000 feet of plastic mulch for one acre of tomatoes. You must decide which type of plastic mulch to use and how much is needed for your half acre plot. You must also calculate the cost of the needed trickle tape. Evaluate the data in section L and M of the Student Packet and your calculations are to be shown in section M.

Polyethylene Nondegradable Information

4,000 feet per roll

\$75.00 per roll

Polyethylene Degradable Information

4,000 feet per roll

\$120.00 per roll

Trickle Tape Information

6,000 feet per roll

8,000 feet to accommodate one acre

\$118.00 per roll

STUDENT PACKET: E

WHAT'S MY BUDGET?

Chemicals

This section includes information concerning the required herbicides, insecticides, fungicides, fertilizer, and lime. The data given is compatible for one-acre plot of tomatoes. Using this information, your group needs to calculate the estimated cost of chemicals for your half-acre plot. Record the collected data in section L and your calculations need to be demonstrated in sections N and O.

	<u>Unit</u>	<u>\$/Unit</u>	<u>Units/Acre</u>	<u>Applications</u>
<u>Herbicides</u>				
Treflan	pint	\$4.20	2	1
Lexone	pound	\$24.64	1.33	1
<u>Insecticides</u>				
Thiodan	pine	\$4.86	2	2
Asana	ounce	\$1.12	8	6
<u>Fungicides</u>				
Mancozeb	pound	\$3.35	3	5
Brava	pound	\$7.68	2	5
<u>Fertilizer</u>				
10-20-20	pound	\$0.08	600	1
8-52-16	pound	\$1.07	8.5	1
*0-0-60	pound	\$0.08	300	injected (total=\$23.34)
<u>*Ammonium</u>				
Nitrate	pound	\$0.10	300	injected (total=\$29.58)
Lime	ton	\$22.00	0.5	1

*These fertilizers are injected through the irrigation system at weekly rates. The totals for one acre of tomatoes are given above.

It is important to note that these data are estimates. The amount and type of chemicals needed on a crop depends on the soil samples and environmental factors.

STUDENT PACKET: F

WHAT'S MY BUDGET?

Other Expenses

The information in the section pertains to other expenses the farmer encounters. Evaluate the data and calculate the expenses for your half-acre crop of tomatoes.

Stakes and Twine

Stakes, along with a trellis of twine, are used to support the plants off the ground once they begin to grow. This prevents damage from mud and it also makes harvesting easier. It is suggested that a stake is placed between every second plant. Since there are 5,000 plants to the acre, it would take 2500 stakes.

It takes approximately six roll of twine to tie an acre of plants one time. The tomatoes are tied a total of three times in order to keep up with the growth of the plants.

Calculate the expenses for twine and stakes using the information below and in the paragraph above. Show your calculations in section O, record your data in section L.

Stake information

2,500 stakes for one acre

1 stake costs \$0.13

Twine information

It takes 6 rolls of twine to tie an acre one time

Tomatoes are tied three times

1 roll costs \$2.45

STUDENT PACKET: G

WHAT'S MY BUDGET?

Trays

During harvest time the farmers are encouraged to purchase trays to use when picking the tomatoes off the vines. In order to keep labor production running smoothly, it has been estimated that the farmer needs ten trays per acre.

Use the data below to calculate the cost of trays for a half-acre of tomatoes. Put your data in section L and show your calculations in section P.

Tray Information

10 trays per acre

1 tray costs \$2.25

Fuel, Lube, and Repairs

The cost of fuel and lube is to be determined by calculating the total number of hours the equipment will be used. The equipment includes tractors, trucks, water pumps, and other equipment needing oil, grease, or fuel. The University of Kentucky College of Agriculture estimates that fuel and lube will cost \$2.57 per hour. The agriculture department at the University of Kentucky has also estimated that when producing and harvesting an acre of tomatoes, a farmer will encounter \$51.55 in repairs. This is only an estimate and this aspect of the budget can vary greatly.

Use the data below to calculate the fuel and lube for production and harvesting, as well as repairs for machinery. Record the data in section L and show your calculations in section P.

Production Fuel and Lube

11 hours per acre at the cost of \$2.57 per hour

Harvesting and Marketing Fuel and Lube

20 hours per acre at the cost of \$2.57 per hour

Repairs

1 acre expected to cost \$51.55

STUDENT PACKET: H

WHAT'S MY BUDGET?

Labor

Other than equipment, labor is probably the greatest expense the farmer will experience. Tomatoes are very labor intense; therefore, it is essential that the farmer maintains accurate records. The farmer should expect at least 60 hours of labor per acre during the production of the crop. It is predicted that 600 hours is required to harvest and market an acre of tomatoes.

Using the information presented in the paragraph and below, calculate the labor expense for a half acre of tomatoes. Record your data in section L and show your work in section Q.

Production Labor

60 hours required for one acre at a cost of \$5.00 per hour

Harvesting and Marketing Labor

600 hours required for one acre at a cost of \$5.00 per hour

STUDENT PACKET: I

WHAT'S MY BUDGET?

Equipment

Special equipment is needed in order to raise a successful crop of tomatoes. On the budget, the expenses or machinery has been depreciated, since the equipment will not need to be purchased every year; however, it is important that the farmer realizes the initial cost of the special equipment.

Water Pump

The water pump is used to transport the irrigated water from the water source to the plants. In order to prevent the cost of city water, it is suggested that the farmer places his crop near a water source, such as a pond.

Sand Filter

The sand filter is used to filter out foreign materials from the water source. This is important in maintaining the condition of the pump and trickle tape.

Sprayer

It is important that the farmer purchase an efficient sprayer to accommodate the spraying needs. A high-pressure sprayer is essential to effectively cover the plants with the desired chemicals. A good spray program is vital to the farmer. If a spray program is not utilized, the farmer could expect a low profit or even a drastic loss.

Bedder and Layer

This piece of equipment is used to make the rows or bed, and to lay the plastic mulch and trickle tape. This machinery mounds up the dirt, which creates a more desirable environment for plant growth. It also lays the trickle tape and plastic mulch simultaneously.

Plant Setter

Since plastic mulch and trickle tape is placed in the plot, a farmer cannot use the traditional tobacco setter to transplant the tomato plants. The tomato setter punches a hole in the plastic and the workers can then place the plants in the prepared slots.

STUDENT PACKET: J

WHAT'S MY BUDGET?

Lifter

If nondegradable plastic mulch is utilized, it is advisable for the farmer to purchase a lifter. This piece of equipment is used to remove the plastic from the site after harvest.

Below is a schedule of equipment cost.

Description	Cost
Water Pump	\$275.00
Sand Filter	\$400.00
Sprayer	\$1,200.00
Bedder and Layer	\$1,650.00
Plant Setter	\$1,350.00
Lifter	\$550.00
Total	\$5,425.00

Fixed Costs

This section on the budget takes into consideration fixed costs that the farmer should expect in his farming operation. Since the cost is "fixed", it is prerecorded into the budget. The possible fixed cost includes depreciation on the equipment given above. The irrigation system is also a part of the depreciation. The farmer must also take into consideration taxes on his/her land as well as insurance. The insurance would include insurance on the crop as well as on the equipment. The fixed costs are shown in section L.

STUDENT PACKET: K

WHAT'S MY BUDGET?

Conclusion and Task

In order to complete this activity, each group needs to calculate the total data for the budget. The data needs to be recorded in section L and calculations need to be exhibited in sections Q and R. The totals need to be calculated in order for each group to realize the profit they obtained on their half acre crop of tomatoes. The following totals need to be determined: total production cost, total harvesting cost, total variable cost, total expenses, and total net.

Congratulations, and I hope you showed an acceptable profit.

STUDENT PACKET: L

TOMATOES: ESTIMATED BUDGET WITH TRICKLE IRRIGATION

	QUANTITY	UNIT	\$/UNIT	TOTAL/ACRE	TOTAL/HALF ACRE
GROSS RETURNS					
Tomatoes		pounds			
VARIABLE COSTS					
PRODUCTION					
Plants		1000			
Plastic Mulch		rolls			
Trickle Tape		rolls			
Herbicides		acre			
Insecticides		acre			
Fungicides		acre			
Fertilizer		acre			
Lime		ton			
Stakes		each			
Twine		rolls			
Fuel and Lube		hours			
Repairs		acres			
Hired Labor		hours			
Total Production Cost					
HARVESTING AND MARKETING					
Trays		each			
Fuel and Lube		hours			
Hired Labor		hours			
Total Harvest and Marketing Cost					
TOTAL VARIABLE COST					
FIXED COSTS					
Depreciation on Machinery and Equipment			\$156.42		
Depreciation on Irrigation System			\$ 93.75		
Taxes on Land			\$ 4.00		
Insurance			\$ 34.03		
TOTAL FIXED COSTS					
TOTAL EXPENSES					
TOTAL NET					

STUDENT PACKET: M

BUDGET CALCULATIONS

Each student in the group needs to show their calculations for all the mathematical procedures used in this activity. If needed to better understand the procedures used, students are encouraged to include an explanation and reasoning for their methods.

Plant Information	Calculations for a Half Acre
-------------------	------------------------------

Size Purchased	
Cost/Box	
Plants/Box	
Packaging Charge	

Return Information	Calculations for a Half Acre
--------------------	------------------------------

Type of Plants	
Average Return/Pound	
Average Pounds/Acre	

Plastic Mulch Information	Calculations for a Half Acre
---------------------------	------------------------------

Type Used	
Cost/Roll	
Feet/Roll	
No. Rolls Needed/Acre	

Trickle Tape Information	Calculations for a Half Acre
--------------------------	------------------------------

Cost/Roll	
Feet/Roll	
No. Roll Needed/Acre	

STUDENT PACKET: N

BUDGET CALCULATIONS

<u>Herbicides</u>	<u>Unit</u>	<u>\$/Unit</u>	<u>Units/Acre</u>	<u>Applications</u>
-------------------	-------------	----------------	-------------------	---------------------

Cost/Acre

Terflan
Lexone

Insecticides

Thiodan
Asana

Fungicides

Mancozeb
Bravo

Fertilizers

10-20-20
8-52-16
0-0-60

Lime

Herbicide Calculations (Half Acre) Insecticide Calculations (Half Acre)

STUDENT PACKET: O

BUDGET CALCULATIONS

Fungicide Calculations (Half Acre)

Fertilizer Calculations (Half Acre)

Lime Calculations (Half Acre)

Stakes Information

Stake/Acre

No. of Stakes Needed

Cost/Stake

Calculations for a Half Acre

Twine Information

No. Rolls for one Tying/Acre

No. of Tyings/Acre

Cost/Roll

Calculations for a Half Acre

STUDENT PACKET: P

BUDGET CALCULATIONS

Tray Information

Trays Needed/Acre

Cost/Tray

Calculations for a Half Acre

Fuel and Lube (Production)

No of Hours Needed/Acre

Cost/Hour

Calculations for a Half Acre

Fuel and Lube (Harvesting)

No. of Hours Needed/Acre

Cost/Hour

Calculations for a Half Acre

Repairs Information

Cost/Acre

Calculations for a Half Acre

STUDENT PACKET: Q

BUDGET CALCULATIONS

Labor (Production)

No. of Hours/Acre

Cost/Hour

Calculations for a Half Acre

Labor (Harvesting)

No. of Hours/Acre

Cost/Acre

Calculations for a Half Acre

Calculations for Fixed Costs (Half Acre)

Calculations for Total Production Cost (Half Acre)

Calculations for Total Harvesting and Marketing Cost (Half Acre)

STUDENT PACKET: R

BUDGET CALCULATIONS

Calculations for Total Variable Cost (Half Acre)

Calculations for Total Expenses (Half Acre)

Calculations for Net Profit (Half Acre)

4. CONNECT

Community:

This lesson can be adapted to any commodity that is valuable to your community. The county extension office can be a valuable resource when obtaining data for the desired commodity.

Language Arts:

Students could create a process entry for portfolios, which explain how a farmer creates a budget for a crop.

Mathematics:

This lesson can easily be used as an investigation or application entry for math portfolios.

Science:

The data in this lesson can be used to develop a science fair project by comparing the effects of nondegradable and degradable polyethylene on the environment. Another suggestion would be to determine the effect rootball size of plants has on plant production.

RESOURCES FOR WHAT'S MY BUDGET

Hendrix & Dial, Greenville, North Carolina.

Kennco, Mfg., Inc., Ruskin, Florida.

Plants of Ruskin, Inc., 1995 "Vegetable Plant Contract", Ruskin, Florida.

University of Kentucky Department of Agriculture, Lexington, Kentucky.

POPULAR PROJECTS AND ACTIVITIES

Many KAEC teachers have used the activities in the following section in their teaching about agriculture and the environment. Because these activities have proven to be popular and successful, and because so many teachers have used them in different ways, they are included in this special section.

GROW LAB LIGHT GARDEN

Teacher: Debbie Jo Mayes & Kristi Hall

County: Ohio

School: Ohio County Middle School and Beaver Dam Elementary School

The Grow Lab was built with intentions of involving students in experiences with plants over several weeks. Hands-on activities were emphasized with the use of the Grow Lab. Activities were implemented in the science curriculum to help students have a better understanding of the growth process. Examples of concepts that may be taught using the Grow Lab include: germination of seeds, transplanting, excessive fertilizing, excessive lighting, insufficient fertilizing, and insufficient lighting.

A Grow Lab enables the teacher and students to grow plants within the walls of the classroom without lighting access. Having a Grow Lab is a great alternative when classrooms have no windows.

Germinated plants as well as mature plants can be distributed to a community, nursing homes, and for beautification projects. A farmer's market is another project that would help finance purchases, such as fertilizer, pots etc., to help operate your Grow Lab.

Directions for construction of Grow Lab follow.

Directions for Construction of Grow Lab

Materials:

- 1/2 sheet of plywood, 1/2" thick, cut into 2 shelves, 2 x 4 feet each.
- 45 feet of PVC pipe, 1 1/2" diameter, cut into pieces according to the diagram
- 8 PVC elbows
- 16 PVC tees
- 1 can PVC primer, 6 oz.
- 1 can PVC adhesive, 6 oz.
- 2 heavy duty fluorescent shop light fixtures, 48" long
- Chain and S-hooks for hanging light fixtures
- 1 multi-outlet strip with cord and on-off switch
- 1 grounded timer
- 4 plastic cable ties

Directions for Assembly

Ends

1. Lay one end out on the floor or on a large table so that the pieces according to the End View diagram make sense. Put all the pieces together without gluing.
2. Use a pencil to mark each piece where they go together. Be sure the angles are correct, number each joint.
3. Paint primer on each piece and let dry. Glue the end assemblies together, plus glue around the end of each piece (about 1/2" wide band), then join the pieces. As you reinsert the pieces and line up the marks, work quickly. The glue dries very fast (15 seconds) and will NOT come apart again. Since the cross-pieces of each end (F-T-D-T-F) are all the same, you might want to assemble these first.
4. Repeat this process with the other end.

Crossbars

5. With one end on the floor, insert the crossbars and mark. Prime and glue.
6. Fit the other end onto the 6 vertical crossbars. Mark and prime. Working with an assistant ALL 6 crossbars and the remaining end are glued at the same time.

Finishing

7. Paint the shelves and place them on the supporting crossbars as desired. Cover each shelf with vinyl, plastic trays, etc. if desired.
8. Assemble and hang the light fixtures, using chain and S-hooks. The lights will need to be moved up and down to be near the plants; keep this in mind when arranging chain and the fixture's cord.
9. Strap the outlet strip to one of the pipes using the plastic cable ties; plug cord into timer and wall outlet.

HOW TO USE THE KAEC MOBILE UNIT

The KAEC Mobile Unit was developed to provide support and encouragement to teachers attempting to integrate the agriculture and environment themes into their classrooms. The Mobile Unit is a trailer 32 feet long sponsored by the Kentucky Pork Producers Association. It is for the exclusive use of KAEC teacher participants to provide resource materials for the teachers of Kentucky. Many of the resource materials have been donated by various agriculture organizations and government agencies.

The Mobile Unit will travel to schools upon request and stay for two days. During the two-day visit teachers may have access to any item stocked in the Mobile Unit for use in their classrooms. Another option the Mobile Unit offers is an opportunity to review resources just to discover what is available to be obtained free or by purchase from the source listed on each item.

The only condition to requesting the Mobile Unit for a school visit is that at least one teacher from a school has participated in one of KAEC's teacher workshops. Once this condition is met, and the visit is scheduled, all teachers at the host school may have access to the resource materials housed on the Mobile Unit during the two day visit. If you are interested in requesting the KAEC Mobile Unit to visit your school the following is a list of guidelines to follow:

- Talk to your principal to see where the Mobile Unit can park to be accessible to all teachers
- Have more than one date in mind for the school visit before calling.
- KAEC will mail a complete inventory guide of the Mobile Unit's resources before the visit.
- This guide will include a brief description of the resources and the companies producing the items. This allows teachers to pre-plan use of the resources in the classroom and purchase resources directly from the companies.
- Review the resource list and select specific materials that you wish to use and write them down. Once the Mobile Unit arrives you may give this list to the KAEC representative those items will be pulled for your immediate use.
- Share the resource list with all teachers in the school and prepare them for about what to expect during the Mobile Unit visit. All teachers at the school may use the resource materials.
- Even if some teachers do not choose to pre-select resource materials for immediate use in the classroom, they are welcome to visit the Mobile Unit and browse through the varied resource materials.
- A TV/VCR and a Power Mac, IBM compatible computer with multi-media capabilities and printer are available for screening videos and computer programs.

If you have specific questions, and/or wish to schedule a school visit, contact Rayetta Boone at the Kentucky Department of Agriculture at 502-564-4696.

ORGANIZING AN AGRICULTURE DAY

Teacher: Carol Murr and Rebecca K. Spencer

County: Greenup

School: Wurtland Elementary School

The goal of this special activity is to introduce students to agriculture that relates to them and their community. The Agriculture (Ag) Day can be set up as individual booths or mini-workshops, and the components of the event should allow for easy extension to regular classroom assignments.

To begin your preparation for the event, it is strongly suggested that you work with your school's administration and encourage parent participation. A letter to the parents explaining your project and asking for suggestions or volunteer services can be helpful in countless ways. The letter should explain the time requirement, and your main objective. This gives parents a starting point when developing suggestions for the event. Parents are wonderful for suggesting resource people and ideas, or providing manual labor. It is also suggested to include a letter for parent signature, removing liability from the school in case of injuries.

Once topics for exhibits have been determined, a schedule should be developed. The schedule should include participating areas, presenters and events, with a brief description of each. A map of the area that shows the location of each event should also be designed and given to each participant.

Divide the students into teams and assign each team a specific color. Tags with team colors should be worn by the students during the event. This provides better management when trying to maintain contact with students.

For convenience, sack lunches should be served; however, snacks could focus upon agricultural products, or even Kentucky agricultural production. A booth called "Sample Dairy Products" can provide samples, of cheeses, ice cream, yogurt, farm butter on crackers, and types of milk.

The information that follows provides more specific suggestions that are useful in organizing the Ag Day.

COMMUNITY CONTACTS AND INVOLVEMENT

Neighbors

County Extension Agents

Kentucky State Aquaculture Research Center, Kentucky State University, Frankfort, KY

Local Farmers

Local Business People

Local Conservation District

Fish and Wildlife

State Forestry

Local Farm Bureau

Veterinarian

Agriculture Groups (Kentucky Soy Bean Association, Gourd Association, Cattlemen Association, etc.)

University Agriculture Colleges such as Eastern Kentucky University, Murray State

University, University of Kentucky, and Western Kentucky University

SUGGESTIONS FOR WORKSHOPS OR BOOTHS

Haymobile Farm Tour

Take a hayride and oral history of a family farm.

Herbal Harvest

Study pioneer farming and the historical uses of herbs in contrast to their uses today.

Bees Make Honey

If there are hives in the area, show honey as a farm product in the past and today. As a science product, study the bee family.

From Farm to the Table

What were subsistence farms? How are farms different today? How do we get our food products? What is involved in cost? Show the steps involved in getting food products from field to the table.

From Moo to Butter

Students could make butter from scratch and practice churning.

Bread from Scratch

Practice pioneer farm tasks, such as grinding corn (or other grain), making flour and baking bread. (All pioneer farm tasks). Prepare apple butter.

Old Farm Machines

Climb aboard the old tractors; hop into a corn sled; check out a horse-drawn mower and rake. Study tools and machines of the past and how they were used.

Orchard Treats, Really Neat

The apple brought sweet smells from the kitchen. Learn how to make applesauce and butter the way "Grandma" made it.

Painting with Earth's Color

Create colors with dyes from nature.

Candle Crafting and Soap Making

Make soap and candles. Children might make homemade lye soap to take home.

Corn, the Versatile Veggie

Look at the value of corn to the farmer, yesterday and today. The many uses of corn include flour, fuel, and environmentally safe packing materials.

Farmer's Market

Prepare a display of various fruits and vegetables that are labeled with their common and scientific names. Encourage students to prepare related questions such as what is the weight of one bushel of corn?

Catfish and Strawberries, an Unlikely Twosome

Some small farming ventures can live in symbiotic harmony and be very productive in both areas. Development of catfish ponds and farms in the mountains opens the door to hydroponic farming. Waste water from fish ponds both irrigates and fertilizes soil for more productive vegetable and fruit growth.

A Poultry Farm

What involvement is there to being a poultry farmer? Ask the residential expert who was born and raised on a poultry farm. Can we establish profitable poultry farms in our area? Demonstrate the incubation process for eggs.

Goats

Take a close look at the goat industry and the possibility of it becoming a source of income.

Life on a Horse Ranch

How is the horse significant to Kentucky's economy? What is it like to be a horse rancher? What is involved in the care and training of horses?

Farming for Tomorrow

Look at the present, and predict what agriculture will be like in the future. Identify agricultural inventions and innovations that make farming more productive and environmentally friendly.

1. Corn in the straw

Preparation: Hay wagon with loose straw and a hidden red ear of corn. (Use an ear of popcorn.)

Procedure: Contestants run to the wagon, hop on and look for the ear of corn.

The winner is the person who finds the ear of corn.

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2. Apple Paring Contest

Preparation: Eight apples and eight apple peelers.

Procedure: Each contestant must try to peel the longest unbroken, single strand of peel from the apple in 30 seconds.

3. Apple on a String

Preparation: Eight apples on long strings tied to a long board or similar support. One contestant, each team.

Procedure: Contestants with hands behind back must attempt to eat the hanging apple on string.

The time limit is one minute. The winner is the student who eats the most from the apple. Students are disqualified if they touch the apple with their hands or if it falls to the ground.

4. Milking Contest

Preparation: Milk cow, glasses of the same size, rubber gloves.

Procedure: Students are given one minute to milk the cow. The winner is the student who has the most milk in the glass. At the conclusion of this activity, consider showing the video, "From Moo to You", available from the American Dairy Association.

SUGGESTIONS FOR FOLLOW-UP PROJECTS

1. Making a Quilt for Agriculture

Each team leader/teacher will be given a 12" square of cloth material. The groups are to make a quilt piece displaying the theme, "Back to the Farm." Try to complete the quilt in time to enter in a local fair or community festival.

2. Alternatives for the Future

(This project could be adapted for all grade levels but would be more appropriate for the upper grades.)

Two leading industries in Kentucky are "on the edge" - coal and tobacco. What alternatives could Kentucky consider to solve these problems?

For example, western Kentucky has started emphasizing poultry farming to replace lost revenue from coal mines. It has proved highly successful.

Could profitable agriculture be achieved on reclaimed strip mine sites? What about cattle feed lots? What other areas could be considered? Remember that Kentucky is only a day's drive for 80% of Americans.

3. Take Count (Intended for study prior to a field trip.)

There is more to farming than meets the eye. Diversified farms and farms are found throughout the world. Have students complete a list of as many different kinds of farms as they can. As a follow-up, encourage students to make a mural illustrating these different kinds of farms.

4. Shoebox Diorama

This activity is especially appropriate for intermediate and middle grades.

Each child will need a shoebox or a box about the same size. Using construction paper, instruct students to draw a farm scene. They could also make three-dimensional buildings. Trees can be small twigs of real trees. Collect various scraps that can be used. Clothespins make good stick figures to represent people. Clay, modeling putty, or a silly putty substance for anchoring trees and people will be needed. Remember, the object is to create a farm.

PARTNERSHIPS

Teacher: Gay Burden

County: Daviess

School: Daviess County High School

There are numerous opportunities to form partnerships in education. First, decide whom you want to partner with, and what your objectives will be. It is important in forming successful partnerships to let your fellow faculty and administrators know of your plans. Prepare the students by letting them know the responsibility they are assuming. Students could sign an employment contract, binding them to be committed to the project.

Begin by letting the students name their company. Remind them that a company name usually helps the consumer identify the nature of the business. Pride in ownership will encourage your students to succeed and make a profit. Consider forming a corporation. Sell shares of stock for \$1 in the company, letting students invest up to \$5. This initial capital should be used to establish a bank account for the business. Students vote on company decisions based on the number of shares they own. Letting the stockholders vote on a board of directors is an excellent way to identify and develop leadership roles during the project. The board of directors can develop a work schedule delegating students to sell or take orders during their breaks, before and after school, or on weekends. Students must record their hours on a time sheet. Students should be allowed the flexibility to trade work hours among themselves if it is mutually convenient. If orders are taken, a delivery work schedule must also be outlined.

Apply for a loan at the school bank. You or another teacher can help make this a realistic experience by having the bank's loan officers visit the class to discuss the company's product or services. Students should be prepared to provide the bank with a sample of their product. The students should also have a budget and be prepared to answer questions regarding projected expenses and revenue. The students' initial capital investment will be used as collateral for the loan. Thus, as entrepreneurs, the students are realistically exposed to the element of risk.

If there is a festival or craft fair in your area, register for a booth. This is a great opportunity for your students to market and sell their product as well as publicize the community partnership.

Once the project is completed, and if there are profits, students could be paid dividends. They could also sell back their shares of stock to the teacher. Some classes may choose to pool their funds together for a banquet.

Other choices might include donating the money to the community, or to a charity. Have a brainstorming session to let the students list ideas of what to do with the profit (if you have one) and then vote as stockholders.

SUGGESTIONS FOR PARTNERSHIPS

The horticulture class could partner with a business class (entrepreneurship, accounting, management, marketing, or finance and banking). Their objective might be growing flowers to sell on Mother's Day.

A high school agriculture class might partner with an elementary school. Objectives include farming, environmental education, or career opportunities in agriculture. Students can present their topics in a variety of ways including children's books, plays, or games.

A welding class may partner with a metal business in the community to produce items the students design and make, using the materials supplied by the business partner. Of course, this idea could be used for most vocational subjects.

A family consumer and science teacher could partner with a business class to sell baked goods. Another idea is to team with the history teacher to research the background in Kentucky crafts and sell hand-made items.

A science class could partner with a social studies class to study an issue that relates to production of agriculture and a related environmental problem. The science students would provide factual information and work with social studies students in examining the issue, and perhaps drawing conclusions or taking a position on the issue.

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